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DIFFERENCES IN CHRONOLOGICAL AGE, MENTAL CAPACITY, AND SEX RATIOS OF CHILDREN REFERRED FROM MANY SCHOOL SYSTEMS AS CANDIDATES FOR SPECIAL CLASSES

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How do children referred to a psycho-educational clinic for individual study as candidates for special classes for the mentally deficient differ with respect to chronological age, mental capacity, and sex ratio? What is the proportion of various degrees of backwardness as determined by relative measures of brightness, and what sex differences exist in the distribution of the different grades of mental capacity? Do the girls referred for special-class assignment rate lower than the boys, or vice versa? Is the problem of the education or of the exclusion of children of very low mental ability a very important one, numerically considered, or relatively negligible? What differences with respect to these questions exist in different school systems?

Appeals frequently come to the specialist in special education from superintendents, board members, educators, students, and social workers for accurate information on questions such as these. The present investigation sheds some light on these questions, based as it is on a study of 4663 children referred from a large number of schools. Of these 1019 are consecutive cases examined in the St. Louis Psycho-Educational Clinic from September, 1917, to May, 1920, and 3644 are consecutive cases examined in about 75 school districts in different parts of the state of Ohio by the Psycho-Educational Clinic of the Bureau

of Special Education of Miami University from the fall of 1921 to the fall of 1927.[1]

The manner of selecting the children for examination was as follows. In St. Louis during the period covered by this investigation the principals were required to report to the psycho-educational clinic on prepared blanks[2] twice a year the one per cent of the pupils in the grades who appeared to be "mentally the most seriously deficient or backward," or the "most deficient in native mental capacity." The director of the clinic upon the receipt of the blanks from the schools thereupon selected for individual examination the children who seemed from the data supplied to be the most deficient or to be the most in need of a comprehensive study.[3]

During the triennium prior to this period no such preliminary reports were required. But instructions were occasionally issued by the superintendent to the schools that pupils must be referred to the psycho-educational clinic who were the most backward in their school work and who apparently, therefore,

[1] We have already published data on the clinical or physical types of mentally deficient children which come to a school clinic for assignment to a special class. See The Problems Confronting a Psycho-Educational Clinic in a Large Municipality, Mental Hygiene, 1920, pp. 103–136. The Diagnostic Findings from Seven Years of Examining in the Same Psycho-Educational Clinic, Journal of Delinquency, 1923, 169–195; Studies of Mental Defects and Handicaps, Miami University Bulletin, XII, No. 5, 1924, 5–30, and 42–65.

Similar data accumulated since 1921 are being tabulated.

Assistance in compiling the tabular data for this article has been rendered by Mrs. Margery Gilbert Cutsforth and Mrs. Loraine Tomlinson.

[2] The instructions issued to the schools are reproduced in *Mental Hygiene*, 1920, p. 112 f.

[3] During this period, however, a comparative study was made of the selection of children for individual examination by means of a standardized primary group intelligence test. This method of selection proved inferior to the other method. It yielded a lower ratio of mentally deficient and borderline cases, and higher average Binet IQ's, although only the children who were in the lowest decile were examined. See A Comparison of Three Methods for Making the Initial Selection of Presumptive Mental Defectives, School and Society, 1921, 31–45.

were the most deficient mentally and presumptive eligibles for the special schools. In St. Louis all children had to be individually examined before assignment to special schools, but children could be assigned by the principal to the ungraded classes for backward children, which served as observation classes, and as clearing houses with the clinic, for children of doubtful diagnosis. In the case of such transfers it was provided that all the children who did not make reasonable progress should later be examined in the clinic.

The types of classes organized by the writer in Dayton from 1922 to 1927 followed the pattern earlier worked out experimentally in St. Louis, and the instructions for the selection of examinees were similar, but no preliminary reports were required except on two occasions. In correspondence with all the superintendents in the other Ohio school districts the writer always suggested the advisability of restricting the first selections largely to the children who seemed from their general behavior reactions and degree of deficiency in the school work to be the most backward or deficient mentally. The instructions in the county surveys were to limit the examinees to the two per cent of grade children who appeared to be the most backward mentally.

It is apparent that the instructions governing the referring of children for examination were fairly uniform, but were they followed? I believe they were with the following exceptions. Practically all school systems included a limited number of children who were problems for other reasons than mental backwardness. Some included a few normal or bright children, for whom they wanted ratings; while Oxford (nearly all the children came from William McGuffey School of Miami University) on two occasions included all the children in the first grade. Oxford excepted, the method of selection probably is sufficiently uniform to afford fairly reliable answers to the questions here propounded concerning the most backward children referred for examination from the elementary grades. Since the data have been gathered from a large number of school systems by fairly uniform methods of selection and of examina-

tion, it would seem that the results should be fairly representative of the typical or modal school system.

Uniformly the examinations comprised a preliminary general physical examination (and frequently subsequent special examinations by medical specialists), the investigation of the educational, personal, and family histories, one or more psychomotor tests, and the Stanford Binet. The wide-range method of testing was always used, an earlier investigation based on 1181 clinic cases having shown that children given about twice as many advance tests earned over three-fourths of a year of advance credit more than those tested more narrowly.[4]

The St. Louis children were given the psychological tests by myself, and the Ohio children by trained assistants.[5] The writer interviewed almost all the examinees, and reviewed all the findings before any diagnoses or recommendations were made.

The discussion of the results of this study must be curtailed because of space limitations. For the same reason and also because of the expense of publishing tabular data, tables have been published only for the St. Louis, Dayton (1114 cases), and the combined Ohio cases, although references will be made in the text to findings in other Ohio groups which contain a considerable number of cases, namely, Warren (407 cases), Greenfield (176 cases), Miami County (163 cases) and Oxford (253 cases).

CHRONOLOGICAL AGE DISTRIBUTION

(See tables 1, 6, and 11.)

The tendency to defer examinations or to permit subnormal children to linger for years in the regular grades is at once apparent from an inspection of the tables showing the distribution of chronological ages. For All Ohio (*i.e.*, all the Ohio school districts), 51.9 per cent of the children were over ten years of age at the time of the examination. The corresponding figures for the different cities are, in descending order: Dayton, 57.6

[4] Clinical and Abnormal Psychology, 1927, 123 and 169.

[5] Those tested by unqualified students were not included.

per cent, Miami County, 52.2 per cent, St. Louis, 46.7 per cent, Greenfield, 43.7 per cent, Warren, 35.9 per cent, and Oxford, 22.1 per cent.

TABLE 1

St. Louis children. Chronological age distribution

AGE	COLORED BOYS		COLORED GIRLS		TOTAL BOYS*		TOTAL GIRLS*		TOTAL CHILDREN*	
	Number†	Per cent†	Number†	Per cent†	Number†	Per cent†	Number†	Per cent†	Number†	Per cent†
Over 16					4	0.6	6	2.1	10	1.0
16	1	2.4			6	0.8	3	1.0	9	0.9
15	1	2.4			7	1.0	12	4.1	19	1.9
14	2	4.8			29	4.0	9	3.1	38	3.7
13	3	7.1	2	13.3	69	9.5	33	11.3	102	10.0
12	2	4.8	4	26.7	95	13.1	42	14.3	137	13.4
11	8	19.0	4	26.7	115	15.9	46	15.7	161	16.0
10	8	19.0	1	6.7	131	18.1	44	15.0	175	17.2
9	6	14.3	2	13.3	135	18.6	41	14.0	176	17.3
8	9	21.4	2	13.3	96	13.2	37	12.6	133	12.1
7	2	4.8			33	4.6	15	5.1	48	4.7
6					4	0.6	4	1.4	8	0.8
5					2	0.3			2	0.2
4										
3							1	0.3	1	0.1
Total.....	42		15		726		293		1,019	

* These columns contain the colored boys and girls in columns two and four and possibly other colored children who could not be indentified as such because of the lack of access to the original clinic files at the time the data were compiled for publication. Because of the fact that all the white children could not be positively identified, separate tabulations of the white boys and girls were not made for the St. Louis cases.

† In all tables number indicates the number, and per cent the percentage of cases included in the group.

The IQ's in all tables are based on the Stanford-Binet scale. The wide-range method of testing was employed.

Seventy-two and six-tenths per cent of the All Ohio children were over 8 years old, the corresponding percentages for the different cities being, in descending order: St. Louis 81.2,

TABLE 2

*St. Louis children. IQ distribution by ten-step intervals**

IQ	COLORED BOYS		COLORED GIRLS		TOTAL BOYS		TOTAL GIRLS		TOTAL CHILDREN	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
105–114					2	0.3	1	0.3	3	0.3
95–104					17	2.3	1	0.3	18	1.8
85–94	2	4.8			92	12.7	9	3.1	101	9.9
75–84	6	14.3			192	26.5	26	8.9	218	21.4
65–74	15	35.7	5	33.4	224	30.9	99	33.8	323	31.7
55–64	12	28.6	8	53.4	121	16.7	85	29.0	206	20.2
45–54	5	11.9	1	6.7	40	5.5	39	13.3	79	7.7
35–44	1	2.4	1	6.7	19	2.6	26	8.9	45	4.4
25–34	1	2.4			9	1.2	4	1.4	13	1.3
0–24					10	1.4	3	1.0	13	1.3
Total.....	42		15		726		293		1,019	

* The IQ's in all tables are based on the Stanford-Binet scale. The wide-range method of testing was employed.

TABLE 3

St. Louis children. IQ distributions by major step intervals

IQ	COLORED BOYS		COLORED GIRLS		TOTAL BOYS		TOTAL GIRLS		TOTAL CHILDREN	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
90 and above	1	2.4			54	7.4	8	2.7	62	6.1
70–89	13	30.9	2	13.3	365	50.0	73	24.9	438	43.0
50–69	24	57.1	11	73.4	251	34.6	160	54.6	411	40.3
Below 50	4	9.5	2	13.3	56	7.7	52	17.7	108	10.6
Total.....	42	99.9	15	100.0	726	99.7	293	99.9	1,019	100.0
Below 70	28	67.2	13	86.6	307	42.3	212	72.4	519	50.9
Below 35	1	2.4	0	0	19	2.6	7	2.4	26	2.6

Dayton 77.5, Greenfield 71.6, Miami County 71.2, Warren 62.7, and Oxford 35.9.

On the other hand, for All Ohio only 8.8 per cent of the examinees were less than 7 years of age. The percentages for the different cities in descending order are: Oxford 32.4, Warren 12, Greenfield 8.5, Miami County 8, Dayton 6.6, and St. Louis 1.1. Disregarding the data for Oxford, which are

TABLE 4

St. Louis children. Decile distribution of IQ's

DECILE	COLORED BOYS	COLORED GIRLS	TOTAL BOYS	TOTAL GIRLS	TOTAL CHILDREN
High score*	92.5	72.5	107.5	112.5	112.5
9th	78.8	71.3	88.4	77.8	86.7
8th	74.7	68.3	83.0	72.5	80.8
7th	71.7	65.8	79.0	69.4	76.4
6th	68.4	63.8	75.6	66.7	72.9
5th	66.1	62.5	70.5	63.8	69.7
4th	63.4	60.0	69.2	60.4	66.6
3rd	60.4	58.1	65.9	56.9	62.7
2nd	56.4	56.2	61.0	51.7	57.8
1st	50.3	47.5	53.8	43.8	49.2
Low score†	27.5	42.5	17.5	17.5	17.5

* Midpoint of the highest five-step interval. Same in all corresponding tables except where noted.

† Midpoint of the lowest five-step interval. Same in all corresponding tables except where noted.

not comparable for the reason given, the best record in all comparisons for early selection is made by Warren and Greenfield.

In a thoroughly efficiently organized school system having as a minimum a dual system of special and ungraded classes,[6] the major percentage of these children would have been examined and assigned before the age of seven instead of after

[6] As described in The Education of Handicapped Children, 1924, 97f. and 130–151.

the age of ten. Practically all of the children who were seriously mentally retarded at ten (mentally deficient, borderline, and all-around backward, according to the standards proposed in the last reference) were seriously mentally retarded before seven and should have been transferred to special or ungraded (or observation) classes several years earlier than was the case. The value of early assignment has been emphasized so frequently that it need not be dwelled upon here. But early assignment to special classes for the mentally deficient probably will not be secured until classes (by whatever name known, *e.g.*, ungraded, opportunity, observation, or adjustment) have been established for doubtful or borderline cases who ought not to be placed with the low-grade or mentally deficient children. School authorities naturally and properly will be reluctant to

TABLE 5

St. Louis children. Median IQ for each chronological age

AGE	COLORED BOYS	COLORED GIRLS	TOTAL BOYS	TOTAL GIRLS	TOTAL CHILDREN
Over 16			50.0	50.0	50.0
16	42.5		42.5	47.5	44.0
15	77.5		62.5	60	60.6
14	65.0		60.5	52.5	57.5
13	57.5	60.0	66.25	50.8	62.8
12	75.0	60.0	70.45	64.0	69.0
11	65.0	67.5	73.3	67.1	70.9
10	65.0	67.5	74.7	66.7	72.2
9	60.0	60.0	74.5	66.8	72.7
8	69.1	55.0	73.2	64.6	71.6
7	75.0		74.5	63.75	71.4
6			80.0	65.0	66.7
5			90.0		90.0
4					
3				112.5	112.5
For total distribution....	66.1	62.5	70.5	63.8	69.7

TABLE 6

All Ohio children. Chronological age distribution

AGE	WHITE BOYS		WHITE GIRLS		WHITE CHILDREN		COLORED BOYS		COLORED GIRLS		COLORED CHILDREN		TOTAL BOYS		TOTAL GIRLS		TOTAL CHILDREN	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Over 16	55	2.6	39	3.5	94	2.9	5	2.0	2	1.6	7	1.9	60	2.5	41	3.3	101	2.8
16	82	3.8	35	3.1	117	3.6	11	4.4	7	5.7	18	4.9	93	3.9	42	3.4	135	3.7
15	155	7.2	59	5.2	214	6.5	26	10.4	10	8.2	36	9.7	181	7.6	69	5.5	250	6.9
14	193	9.0	96	8.5	289	8.8	30	12.1	11	9.0	41	11.1	223	9.3	107	8.6	330	9.0
13	198	9.2	116	10.3	314	9.6	28	11.2	11	9.0	39	10.5	226	9.4	127	10.2	353	9.7
12	222	10.3	106	9.4	328	10.0	26	10.4	21	17.2	47	12.7	248	10.4	127	10.2	375	10.3
11	204	9.5	109	9.7	313	9.6	22	8.8	11	9.0	33	8.9	226	9.4	120	9.6	346	9.5
10	231	10.8	117	10.3	348	10.6	27	10.8	7	5.7	34	9.2	258	10.8	124	9.9	382	10.5
9	231	10.8	104	9.2	335	10.2	24	9.7	14	11.4	38	10.2	255	10.7	118	9.5	373	10.2
8	217	10.1	105	9.3	322	9.8	20	8.0	3	1.6	23	6.2	237	9.9	108	8.6	345	9.4
7	190	8.9	114	10.0	304	9.3	17	6.8	13	10.7	30	8.1	207	8.7	127	10.2	334	9.2
6	141	6.6	94	8.3	235	7.2	10	4.0	11	9.0	21	5.7	151	6.3	105	8.4	256	7.0
5	22	1.0	26	2.4	48	1.2	2	0.8	1	0.8	3	0.8	24	1.0	27	2.2	51	1.4
4	2	0.1	6	0.5	8	0.2	1	0.4			1	0.2	3	0.1	6	0.5	9	0.2
3	3	0.1			3	0.1							3	0.1			3	0.1
1			1		1										1	0.1	1	
Total.....	2,146		1,127		3,273		249		122		371		2,395		1,249		3,644	

TABLE 7

All Ohio children. IQ distribution by ten-step intervals

IQ	WHITE BOYS		WHITE GIRLS		TOTAL WHITE		COLORED BOYS		COLORED GIRLS		TOTAL COLORED		TOTAL BOYS		TOTAL GIRLS		TOTAL CHILDREN	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
175–184							1				1		1					
165–174																		
155–164																		
145–154	5	0.2	2	0.2	7	0.2							5	0.2	2	0.2	7	0.2
135–144	8	0.4	5	0.4	13	0.4							8	0.3	5	0.4	13	0.4
125–134	16	0.7	15	1.3	31	0.9			1	0.8	1	0.2	16	0.7	16	1.3	32	0.8
115–124	29	1.4	26	2.3	55	1.5	2	0.8	2	1.6	4	1.0	31	1.3	28	2.2	59	1.3
105–114	66	3.1	37	3.3	103	3.1	2	0.8	1	0.8	3	0.6	68	2.2	38	3.1	106	3.2
95–104	139	6.5	75	6.3	214	6.5	9	3.6	6	4.9	15	4.0	148	6.2	81	6.4	229	6.3
85–94	300	14.0	127	11.3	427	13.0	26	10.4	15	12.3	41	11.1	326	13.6	142	11.4	468	12.8
75–84	500	23.3	197	17.5	697	21.3	59	23.7	25	20.5	84	22.6	559	23.3	222	17.8	781	21.2
65–74	523	24.3	269	23.9	792	24.2	69	27.7	23	18.8	92	24.8	592	24.7	292	23.4	884	24.2
55–64	349	15.8	240	21.3	589	17.8	50	20.1	31	26.1	81	21.8	399	16.7	271	21.7	670	18.4
45–54	152	7.1	82	7.3	234	7.1	20	8.0	15	13.0	35	9.4	172	7.2	97	7.8	269	7.1
35–44	40	1.8	40	3.5	80	2.4	5	2.0	3	2.5	8	2.1	45	1.6	43	3.4	88	2.4
25–34	13	0.6	9	0.8	22	0.7	5	2.0			5	1.3	18	0.8	9	0.7	27	0.8
0–24	6	0.3	3	0.3	9	0.3	1	0.4			1	0.2	7	0.3	3	0.2	10	0.3
Total.....	2,146		1,127		3,273		249		122		371		2,395		1,249		3,644	

Total.....	2,146		1,127		3,273		249		122		371		2,395		1,249		3,644	

TABLE 8

All Ohio children. IQ distributions by major step intervals

IQ	WHITE BOYS		WHITE GIRLS		TOTAL WHITE		COLORED BOYS		COLORED GIRLS		TOTAL COLORED		TOTAL BOYS		TOTAL GIRLS		TOTAL CHILDREN	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
90 and above	391	18.2	212	18.7	603	18.4	24	9.6	16	13.1	40	10.8	415	17.3	228	18.3	643	17.6
70–89	927	43.2	401	35.6	1,328	40.6	106	42.6	47	38.5	153	41.2	1,033	43.1	448	35.8	1,481	40.6
50–69	714	33.3	434	38.5	1,148	35.1	102	41.0	52	42.6	154	41.5	816	34.1	486	38.9	1,302	35.7
Below 50	114	5.3	80	7.1	194	5.9	17	6.8	7	5.7	24	6.5	131	5.5	87	7.0	218	6.0
Total.....	2,146	100.0	1,127	99.9	3,273	100.0	249	100.0	122	99.9	371	100.0	2,395	100.0	1,249	100.0	3,644	99.9
Below 70	828	38.6	514	45.6	1,342	41.0	119	47.8	59	48.3	178	48.0	947	39.5	573	45.9	1,520	41.7
Below 35	19	0.9	12	1.1	31	0.9	6	2.8			6	1.6	25	1.0	12	0.9	37	1.0

transfer such children early in their school careers if ungraded classes are not available.

Is there any sex difference with respect to the age of selection for examination? Our data do not justify any very definite answer. The modal age is lower for the boys in St. Louis, Dayton, Miami County, and All Ohio, and for the girls only in Greenfield and Warren. But relatively more girls than boys less than seven years of age are reported from all places except

TABLE 9

All Ohio children. Decile distribution of IQ's

DECILES	WHITE BOYS	WHITE GIRLS	WHITE CHILDREN	COLORED BOYS	COLORED GIRLS	COLORED CHILDREN	TOTAL BOYS	TOTAL GIRLS	TOTAL CHILDREN
High score	152.5	147.5	152.5	175.0*	127.5	175.0*	175.0*	152.5	175.0*
9th	98.3	101.4	99.3	89.7	93.2	90.9	97.4	100.7	98.5
8th	88.9	89.1	88.9	83.4	85.3	83.9	88.3	88.7	88.4
7th	83.3	82.8	83.1	79.2	79.4	79.3	82.8	82.4	82.7
6th	78.9	77.0	78.4	74.9	75.4	75.1	78.5	76.7	78.5
5th	74.7	71.9	73.7	70.9	70.8	70.8	74.4	71.8	73.5
4th	70.6	67.7	69.6	67.4	64.9	66.9	71.9	67.6	69.3
3rd	66.6	63.8	65.6	63.7	60.6	62.5	66.3	63.4	65.3
2nd	61.5	59.6	61.1	58.6	56.9	57.9	61.6	59.2	60.7
1st	55.1	54.0	54.4	52.8	52.4	52.6	54.9	52.9	54.2
Low score	10.0†	22.5	10.0†	22.5	37.5	22.5	10.0†	22.5	10.0†

* Actual highest score.

† This interval is 0–19.

Greenfield. The difference amounts to 0.9 per cent in St. Louis, 4.2 per cent in Dayton, 9.7 per cent in Miami County, 3.5 per cent for All Ohio, and 10 per cent in Greenfield. Likewise, of children over ten years of age, the proportion of girls is greater except for All Ohio and Miami County, the maximal differences amounting to 16.5 per cent for Miami County, 6.7 per cent for St. Louis and 5.1 per cent for Warren. Accordingly,

the ratios of the girls who were less than seven and more than ten years of age are larger than the corresponding ratios among the boys examined. Thus the percentage of both younger and older examinees is larger among the girls than among the boys.

Of greater significance than the sex difference in the ages of the examinees, is the distinct preponderance of boys referred for examination.

PROPORTION OF BOYS AND GIRLS SELECTED FOR EXAMINATION

Oxford excepted, fully two-thirds of the children selected for examination were boys, as shown by the following percentages:

	BOYS	GIRLS
St. Louis	71.2	28.8
All Ohio	65.7	34.3
Dayton	66.3	33.7
Warren	66.8	33.2
Greenfield	67.6	32.4
Miami County	71.2	28.8
Oxford	53.4	46.6
All examinees	66.9	31.1

The ratios are practically the same for the colored pupils:

	BOYS	GIRLS
St. Louis	73.7	26.3
All Ohio	67.1	32.9
Dayton	65.6	34.4

It is interesting to note that the sex ratios in St. Louis did not vary much during a seven-year period:

	1914–15	1915–16	1916–17	1917–18	1918–19	1919–20	1920–21
Boys	74.4	69.2	71.1	70.4	70.2	69.9	64.2
Girls	25.5	30.4	28.8	29.2	29.5	30.0	35.1

Treadway and Lundberg,[7] and other school examiners, have reported similar findings. A somewhat similar preponderance of boys assigned to special classes for mental deficients (and

TABLE 10

All Ohio children. Median IQ for each chronological age

AGE	WHITE BOYS	WHITE GIRLS	TOTAL WHITE	COLORED BOYS	COLORED GIRLS	TOTAL COLORED	TOTAL BOYS	TOTAL GIRLS	TOTAL CHILDREN
Over 16	67.1	61.3	65.0	62.5	52.5	58.8	66.8	60.4	64.6
16	62.9	61.8	62.3	55.0	56.1	55.0	60.3	60.6	60.5
15	66.8	59.3	64.9	62.5	58.8	61.0	66.2	59.6	64.4
14	63.1	62.2	62.7	59.0	62.1	61.6	62.7	62.2	64.9
13	71.3	67.3	69.7	67.5	65.6	66.6	70.9	67.1	69.2
12	73.6	68.9	71.7	75.6	69.4	72.5	73.9	69.0	71.8
11	74.1	71.2	73.1	77.5	78.8	78.8	74.2	71.9	73.4
10	77.0	74.8	76.3	73.2	57.5	72.5	76.6	74.7	76.0
9	78.9	78.9	78.9	78.3	73.3	76.3	78.9	78.0	78.7
8	81.1	81.7	81.3	77.5	87.5	79.2	80.8	81.9	81.1
7	82.8	80.7	82.0	77.5	83.8	81.3	82.5	81.0	82.0
6	83.8	90.0	84.7	78.8	82.5	80.0	83.0	88.8	84.2
5	93.3	103.8	100.8	82.5*	92.5†	83.8	91.7	101.9	100.0
For total distribution.....	74.7	71.9	73.8	70.9	70.8	70.9	74.4	71.8	73.5

* Only two cases.

† Only one case.

formerly males committed to institutions for the feeble-minded) has been frequently noted. Of 1969 children assigned to the St. Louis special schools from 1908 to 1920, 1350 (68.6 per cent)

[7] See reference in Mental Hygiene, 1920, p. 121. For other statistical data on the points here discussed see Hollingworth, Leta S. The Psychology of Subnormal Children, 1920, 9 ff.; and Cornell, Ethel L. Why are More Boys than Girls Retarded in School? The Elementary School Journal, 1928, 96–105, and 213–226.

TABLE 11

Dayton children. Chronological age distribution

AGE	WHITE BOYS		WHITE GIRLS		WHITE CHILDREN		COLORED BOYS		COLORED GIRLS		COLORED CHILDREN		TOTAL BOYS		TOTAL GIRLS		TOTAL CHILDREN	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Over 16	22	3.6	15	4.8	37	4.0	1	0.8			1	0.5	23	3.1	15	4.0	38	3.4
16	24	3.9	10	3.2	34	3.7	3	2.4	7	10.9	10	5.4	27	3.8	17	4.5	44	3.9
15	45	7.3	21	6.8	66	7.1	9	7.4	5	7.8	14	7.5	54	7.3	26	6.9	80	7.2
14	63	10.2	31	10.0	94	10.1	16	13.1	7	10.9	23	12.4	79	10.7	38	10.1	117	10.5
13	56	9.1	47	15.1	103	11.1	13	10.7	7	10.9	20	10.8	69	9.3	54	14.4	123	11.0
12	69	11.2	28	9.0	97	10.5	14	11.5	11	17.2	25	13.4	83	11.2	39	10.4	122	10.9
11	65	10.5	29	9.3	94	10.1	16	13.1	8	12.5	24	12.9	81	10.9	37	9.8	118	10.6
10	67	10.9	23	7.4	90	9.7	14	11.5	3	4.7	17	9.1	81	10.9	26	6.9	107	9.6
9	66	10.9	30	9.7	96	10.3	14	11.5	4	6.3	18	9.7	80	10.8	34	9.1	114	10.0
8	52	8.4	26	8.4	78	8.4	11	9.0			11	5.9	63	8.3	26	6.9	89	8.0
7	52	8.4	23	7.4	75	8.0	9	7.4	5	7.8	14	7.5	61	8.3	28	7.5	89	8.0
6	28	4.5	13	4.2	41	4.4	2	1.6	7	10.9	9	4.8	30	4.1	20	5.3	50	4.5
5	6	1.0	11	3.5	17	1.8							6	0.8	11	2.9	17	1.5
4	2	0.3	3	1.0	5	0.5							2	0.3	3	0.8	5	0.4
3																		
1			1	0.3	1	0.1									1	0.3	1	0.1
Total.....	617		311		928		122		64		186		739		375		1,114	

TABLE 12

Dayton children. IQ distribution by ten-step intervals

IQ	WHITE BOYS		WHITE GIRLS		TOTAL WHITE		COLORED BOYS		COLORED GIRLS		TOTAL COLORED		TOTAL BOYS		TOTAL GIRLS		TOTAL CHILDREN	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
180							1	0.8			1	0.5	1	0.1			1	0.1
145–54	2	0.3	1	0.3	3	0.3							2	0.3	1	0.3	3	0.3
135–44	3	0.5	3	0.9	6	0.6							3	0.4	3	0.8	6	0.5
125–34	4	0.6	7	2.2	11	1.2			1	1.6	1	0.5	4	0.5	8	2.1	12	1.1
115–24	11	1.8	6	1.8	17	1.8	1	0.8	1	1.6	2	1.1	12	1.6	7	1.8	19	1.7
105–14	20	3.2	10	3.2	30	3.2	1	0.8			1	0.5	21	2.8	10	2.6	31	2.8
95–104	46	7.5	18	5.8	64	6.8	7	5.7	3	4.2	10	5.4	53	7.2	21	5.6	74	6.5
85–94	95	15.4	33	10.6	128	13.7	15	12.3	10	15.6	25	13.4	110	14.9	43	11.5	153	13.6
75–84	142	23.0	47	15.0	189	20.2	32	26.2	10	15.6	42	22.5	174	23.5	57	15.3	231	20.6
65–74	146	23.6	75	24.0	221	23.6	31	25.4	11	17.2	42	22.5	177	23.9	86	23.0	263	23.4
55–64	91	14.7	64	20.5	155	16.6	14	11.5	18	28.1	32	17.2	105	14.2	82	21.9	187	16.6
45–54	36	5.8	29	9.3	65	7.0	11	9.0	9	14.0	20	10.7	47	6.3	38	10.2	85	7.6
35–44	13	2.1	15	4.8	28	3.0	5	4.2	1	1.6	6	3.2	18	2.4	16	4 2	34	3.0
25–34	6	0.9	3	0.9	9	1.0	3	2.5			3	1.6	9	1.2	3	0.8	12	1.1
0–24	2	0.3			2	0.2	1	0.8			1	0.5	3	0.4			3	0.3
Total.....	617		311		928		122		64		186		739		375		1,114	

TABLE 13

Dayton children. IQ distribution by major step intervals

IQ	WHITE BOYS		WHITE GIRLS		WHITE CHILDREN		COLORED BOYS		COLORED GIRLS		COLORED CHILDREN		TOTAL BOYS		TOTAL GIRLS		TOTAL CHILDREN	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
90 and above	135	21.9	55	17.7	190	20.5	16	13.1	9	14.1	25	13.4	151	20.4	64	17.0	215	19.3
70–89	261	42.3	110	35.4	371	39.9	56	45.9	21	32.8	77	41.4	317	42.9	131	34.9	448	40.3
50–69	191	30.9	116	37.2	307	33.1	36	29.5	32	50.0	68	36.5	227	30.7	148	39.5	375	33.8
Below 50	30	4.9	30	9.6	60	6.5	14	11.5	2	3.1	16	8.6	44	5.9	32	8.5	76	6.8
Total.....	617	100.0	311	99.9	928	100.0	122	100.0	64	100.0	186	99.9	739	99.9	375	99.9	1,114	100.2
Below 70	221	35.8	146	46.9	367	39.6	50	41.0	34	53.0	84	45.2	271	36.6	180	48.1	451	40.6
Below 35	8	1.3	3	1.0	11	1.2	4	3.3			4	2.2	12	1.6	3	0.9	15	1.4

were boys and 619 (31.4 per cent) were girls.[8] In Germany, based on data reported about 15 years ago, the ratio of boys to girls in the special classes was as 1 to .7.

In spite of this disproportion of boys and girls referred for examination and enrolled in special classes, many mental examiners maintain that there is no difference in the incidence of male and female deficients, the apparent differences being

TABLE 14

Dayton children. Decile distribution of IQ's

DECILE	WHITE BOYS	WHITE GIRLS	WHITE CHILDREN	COLORED BOYS	COLORED GIRLS	COLORED CHILDREN	TOTAL BOYS	TOTAL GIRLS	TOTAL CHILDREN
High score	147.5	147.5	147.5	175.0*	127.5	175.0*	175.0*	147.5	175.0*
9th	100.3	103.1	101.3	93.2	93.3	93.2	99.3	101.8	100.1
8th	91.3	88.4	90.3	85.3	86.8	85.9	90.3	88.1	89.5
7th	84.7	82.1	83.9	81.1	78.6	80.4	84.0	81.5	83.4
6th	80.0	75.1	79.0	77.4	74.4	76.5	79.5	75.0	78.5
5th	76.0	71.2	74.3	73.7	68.3	72.3	75.6	70.8	74.0
4th	71.8	67.2	70.2	69.0	63.5	67.8	71.4	66.3	69.8
3rd	67.5	62.6	65.9	65.8	59.6	62.6	67.2	62.1	65.5
2nd	62.9	57.4	61.1	57.4	56.4	56.9	62.3	57.4	60.5
1st	55.7	50.3	53.7	48.2	52.8	50.9	54.5	51.1	53.1
Low score	10.0†	27.5	10.0†	32.5	37.5	32.5	10.0†	27.5	10.0†

* Actual highest score.

† This interval is 0–19.

attributed to unwillingness both by parents and by teachers frankly to face the problem of the girl deficient; to the fact that the girls do not cause problems of discipline to the same extent that the boys do and are therefore permitted to remain in the grades; to the assumed fact that the dominantly linguistic elementary curriculum is maladapted to the needs of the boys, who therefore fail in larger numbers than do the girls; and to

[8] See Report of the Psycho-Educational Clinic and Special Schools, in Report of the Board of Education of the City of St. Louis, 1920, for the year ending June, 1920, p. 134.

the fact that boys are forced into competitive jobs, while girls can enter into non-competitive service in the home and therefore are of less educational and economic concern.

That the mentally defective girl is able to float longer in society before she becomes a matter of public concern is sug-

TABLE 15

Dayton children. Median IQ for each chronological age

AGE	WHITE BOYS	WHITE GIRLS	WHITE CHILDREN	COLORED BOYS	COLORED GIRLS	COLORED CHILDREN	TOTAL BOYS	TOTAL GIRLS	TOTAL CHILDREN
Over 16	71.0	65.6	68.2	32.5*		32.5*	70.5	65.6	67.9
16	60.0	65.0	62.5	52.5	55.8	53.8	57.5	60.6	59.2
15	69.5	60.8	66.4	59.2	57.5	59.2	67.1	60.0	64.6
14	73.6	64.2	70.8	57.5	62.5	59.5	70.4	63.8	68.0
13	76.9	68.4	72.0	68.8	57.5	65.0	75.3	67.5	71.2
12	78.2	71.7	76.5	75.7	71.3	74.4	76.0	71.5	75.0
11	74.7	71.3	73.2	83.3	75.0	81.7	75.7	71.8	74.0
10	76.8	75.8	76.5	77.5	67.5	75.8	76.9	75.0	76.4
9	81.5	79.0	80.7	81.3	75.0	80.0	81.4	78.3	80.5
8	81.7	76.8	80.0	77.5		77.5	80.3	76.8	79.7
7	85.0	77.5	83.0	97.5	86.3	87.5	85.4	80.0	83.9
6	91.3	81.3	87.5	75.0	92.5	87.5	90.0	85.0	87.5
5	87.5	92.5	88.8				87.5	92.5	88.8
4	135.0†	122.5	123.8				135.0	122.5	123.8
3									
1		142.5*	142.5*					142.5*	142.5*
For total distribution..	76.0	71.2	74.3	73.7	68.3	72.3	75.6	70.8	74.0

* Only one case.

† Only two cases.

gested by the following findings. The number of girls brought to the Clearing House for Mental Defectives in New York City is much less than the number of boys among cases under age 16, but much greater among those over age 16. In the investigation of defectives by Mabel Mathews it appears that about

five times as many females as males get into sex difficulties during the period of adolescence and adulthood and are therefore referred for mental examination during these periods. Boys, on the other hand, are referred to mental clinics earlier because they become unmanageable and begin to commit many offenses (such as pilfering and playing truant) during the periods of late childhood and early adolescence (before age twelve).[9]

May it not be that the increased proportion of older defective girls coming to public clinics merely represents the heightened effort made during the last two decades to ferret out and place in institutions females who have entered the dangerous reproductive period? This movement seems to account for the recent equalization of the number of males and females in public institutions for the feeble-minded.

Our data, on the relative ratio of older boys and girls, although based on far more cases, are not conclusive because of the limited number over 15 years of age. Of the 255 children over 15 years of age, 63.9 per cent were boys, and 36.1 per cent girls. This shows an increase of 3.6 per cent for the girls, and a corresponding decrease for the boys, a perceptible but not a marked change. The following detailed figures should be compared with those on page 12f.

Sex ratio of 255 examinees over 15 years of age

	BOYS	GIRLS
	per cent	*per cent*
St. Louis	52.6	47.4
All Ohio	64.8	35.2
Dayton	61.0	39.0
Warren	70.0	30.0
Greenfield	60.0	40.0
Miami County	72.7	27.3
Oxford	25.0	75.0
All examinees	63.3	36.7

[9] Hollingworth, Leta S. The Psychology of Subnormal Children, 1920, 10. Mathews, Mabel A. Connecticut's Progress in the Care of the Feeble-Minded, Journal of Psycho-Asthenics, 1927, 75 ff.

The increased proportion of girls is marked in St. Louis and Oxford and clearly apparent in Dayton and Greenfield. On the other hand, a slight decrease is noted in the relative proportion of older girls in Warren and Miami County.

RATIO OF VARIOUS LEVELS OF BRIGHTNESS AMONG EXAMINEES

It is interesting to note that the modal ten-step IQ interval is 65–74 in all the tables except one (that for Greenfield where it is 75–84),[10] and that the three intervals containing the largest number of cases are contiguous. They include about two-thirds of all the cases. This 30 IQ range extends from IQ 55 to IQ 84 in all tabulations except Greenfield and Warren, where the range is from 65 to 94. The percentages of children who fall within these 30 IQ steps are as follows in the different tabulations: St. Louis, 73.3; All Ohio, 64.1; Dayton, 61.1; Miami County, 71.2; Greenfield, 64.8; and Warren, 70.5. (The figures are contained in the same tables.) The median IQ is also approximately the same in the different tables: St. Louis, 69.7; All Ohio, 73.5; Dayton, 74.0; Miami County, 71.1; Greenfield, 73.0; and Warren, 74.9. (See tables 5, 10, and 15.)

Should we venture an arbitrary diagnosis of these children on the basis of the intelligence quotient we should say that about three-fourths fall within the limits of our high-grade mental deficient and the merely dull or backward child.[11] This conclusion is in harmony with our earlier clinical diagnosis of 2774 examinees made from a consideration of all the data.[12]

On the basis of the findings from both of these investigations my conclusion is that the median child selected from among the most backward children in the grades is not feeble-minded (in

[10] See tables 2, 7, and 12. Oxford is not included in the comparison for the reason already given.

[11] Earlier discussion of the differential diagnosis of the various grades of mental deficiency and backwardness need not here be repeated. See The Education of Handicapped Children, 1924, 52 f., 63–70, 79 ff; and Studies of Mental Defects and Handicaps, Miami University Bulletin, 1924, 6–11, and 31–41.

[12] Education of Handicapped Children, 346.

the social sense), but of very backward and borderline grade of intelligence.

How large is the variation in the different cities in the ratio of the children of the lowest ability, and how much of a burden is the education of children of very limited ability? Detailed data bearing on these questions are contained in tables 3, 8, and 13, and 4, 9, and 14.

The percentages of children with IQ's below 70 are as follows, in descending order: St. Louis, 50.9; Miami County, 46.6; All Ohio, 41.7; Dayton, 40.6; Warren, 36.5; and Greenfield, 32.4. The difference between the first and the last city amounts to as much as 18.5. The proportion of the children examined who had IQ's below 70 varies from about one-half (St. Louis) to about one-third (Greenfield). The difference amounts to 10.3 per cent between the two cities, St. Louis and Dayton, in which the largest number of children were examined. Apparently this difference is due to the relatively large number of children of high ability examined in Dayton, 18.3 per cent of the Dayton examinees having an IQ of 90 and above as compared with 6.1 per cent for St. Louis. Likewise the relatively low ratios of IQ's below 70 for All Ohio, Greenfield, and Warren seem to be explained by the relatively large number of examinees having IQ's of 90 and above, the percentages being, respectively, 17.6, 19.9, and 15.2.

The proportion of the children examined who had IQ's below 50 varies from 10.6 per cent in St. Louis to 2.8 per cent in Greenfield. For Dayton the percentage is 6.8 per cent, for Miami County 6.1, for All Ohio 6, and for Warren 3.7.

Some psychologists and educationists advocate the exclusion of all children from the privileges of public school care and nurture who fall below Binet IQ 50. Some school systems do, in point of fact, exclude such children unless the parents are obdurate in their insistence that the schools exist for their child also. On this standard 108, or 10.6 per cent, of the 1019, children examined in St. Louis would have been excluded. In point of fact, during the first year of the psycho-educational clinic almost 10 per cent of the examinees were either not

admitted or excluded because of low mentality. The inadvisability of a policy of too generous (or too drastic) exclusion soon became apparent, partly because some parents (including nearly all of those who were genuinely concerned with the welfare of their children who could not afford a private school) chose not to be deprived of public school advantages for their children, and demanded that they be reinstated. Their demands created considerable difficulty for the administrative officers and much criticism of their "cold-blooded" procedure. After several years of experimenting with various standards of exclusion, the writer reached the conclusion that the special classes in the public schools can offer practical forms of training of value to children with a Binet level as low as three years and an IQ as low as from 30 to 35, provided they are not too old chronologically, and subsequently incorporated such provisions in the Missouri State regulations.[13] Over a decade of further first-hand study of the problem in many cities and states has established this practice as a safe and justifiable one for the public schools to follow.

On a Stanford-Binet 35 IQ standard it will not be necessary to exclude many children from school because of low mentality, for such children are not numerous, judging by our findings. Of the children referred for examination only 2.6 per cent had an IQ below 35 in St. Louis, 1.4 per cent in Dayton, 1.0 in all the Ohio cities, 0.6 in Miami County, and 0.2 per cent in Warren. No such children were examined in Greenfield. In the seventeen years in which the writer has directed clinics in three states devoted almost wholly to the examination of public school deficients, no child with zero ability (so far as could be determined by present methods) has ever been brought for examination. Of the 4663 examinees considered in this article only 23, or less than one-half per cent, had less than quarter intelligence based on Binet IQ's. This is a negligible proportion of the total number of pupils enrolled. Moreover,

[13] See Suggested Rules for Special Classes, Educational Administration and Supervision, 1921, 447–458.

the ratings for many of the low-testing children are too low because they were subject to speech defects and linguistic limitations and thus could not do themselves justice in a verbal test. Since no scientific authority with practical clinical and school experience with mentally deficient children has advocated the exclusion of children with IQ's above 50 (although I have known supervisors, testers, teachers, and principals to exclude children as unteachable with Binet IQ's as high as 87), is it worth while to incur the risk of wounding the sensibilities of parents and relatives, and of aggravating the social difficulties of society by ruthlessly refusing to admit to the public schools the insignificant proportion of children who fall between 50 and 35 IQ? Numerically these children constitute neither a financial nor an instructional burden (unless they are unstable) if gathered in centers, or even if scattered in the special classes where they can secure a considerable amount of supervised training from the older high-grade pupils.[14] Unless the state provides residential care for such children, it is better for society to provide useful training for them in special classes than force them to remain in idleness at home, possibly a heavy burden to an overworked mother, or to roam the streets and become aggressively criminalistic or innocent victims of the human vultures who are always ready to prey upon the weak and the credulous. Probably the majority of these children will receive no training if none is provided by the public schools, either because the institutional provisions are inadequate, or because the parents will not consent to parting with their

[14] Since the above was writen, I have been able to secure the total enrollment of children in the eight elementary grades in Miami County, and also in Ashtabula and Preble Counties, in Geneva and Ashtabula Harbor (villages), and in Ashtabula and Conneaut (cities), in which the most backward children were examined in 1928. Estimates have also been secured from the local school authorities in Dayton and Warren of the total enrollment in these grades during the time the examinations were made. Since neither Dayton nor Warren keep a cumulative record of the total number of different children enrolled during a series of years, it has been necessary to base results on the best estimates the school officials could supply. There is no way of checking the degree of inac-

unfortunate children; and this is true of many parents of not only inferior but of good social standing.

We are wont to profess that the schools exist for the purpose of serving the needs of "all the children of all the people."

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curacy of these estimates. They probably possess sufficient reliability to justify the use of the percentages as approximately accurate.

TABLE 20A

Percentage distribution of Stanford-Binet IQ's for the most Backward Children examined in County, Village, and City School Districts in Ohio

LOCATION	ENROLLMENT GRADES I–VIII	IQ's BELOW 68*	IQ's BETWEEN 68 AND 85*	IQ's BELOW 85
County schools				
Ashtabula	4,059	0.86	0.64	1.5
Miami	4,900	1.5	1.2	2.7
Preble	2,600	1.5	1.4	2.9
Exempted village schools				
Ashtabula Harbor	821	0.36	1.34	1.7
Geneva	571	1.2	0.87	2.1
City schools				
Ashtabula	3,036	1.12	0.58	2.0
Conneaut	1,550	1.0	0.97	2.0

LOCATION	ENROLLMENT GRADES I–VIII	IQ's BELOW 35	IQ's BELOW 50	IQ's BETWEEN 35 AND 49	IQ's BELOW 65	IQ's BELOW 70	IQ's BELOW 85	IQ's BETWEEN 65 AND 84
Dayton	30,000	0.05	0.25	0.20	1.0	1.5	2.7	1.6
Warren	10,000	0.01	0.15	0.14	0.92	1.5	3.0	2.1

* Owing to the inaccessibility of the original files when the data for this table were computed, these two-step intervals could not be followed for Dayton and Warren.

On the basis of the entrance standard of 35 IQ (Stanford-Binet), only about 0.05 per cent of the pupils would have to be excluded, while the percentage of children between 35 and 49 IQ who are now automatically excluded in many school systems amounts to only 0.15 or 0.20 per cent. Why not also give this insignificant sector (one sixth of one per cent) its place in the sun of educational opportunities according to their needs?

Is this a mere lip profession and a glittering generalization to be shouted from the housetops only for propaganda purposes during financial drives but to be violated with impunity in practice? That this basic principle of democracy is violated to the detriment of many unfortunate children is notorious.

Some school systems still permit supervisors of special classes, Binet testers, classroom teachers, or principals to exclude pupils from school on the assumption that they are untrainable because of a low IQ or an unsatisfactory school record.[15] To merely deprecate the practice of excluding low-grade children (with Binet IQ's of not less than 30 or 35, or Binet ages of not less than three) from school before they have been afforded adequate probation in a special class will not, if the writer's experience is a safe guide, stop the practice. The surest way to assure children of equal opportunities and rights is to stop precipitate or drastic exclusion by statutory enactments or Board regulations, or by both expedients.

Let not the reader assume that I am making a Don Quixote assault on a man of straw. The practice to which I refer not only represents the deliberately adopted policy of certain public school systems in this country, but the manner in which it is carried out is superficial and contemptuous of the inalienable rights of childhood. It would be easy to supply dozens of illustrations of what I mean. One must suffice. One of my trips brought me into the special classes of a large school system. So far as organization is concerned, this system has been entirely untouched by the mass of evidence accumulated during the last decade to the effect that the first step which must be taken to insure efficiency in special-class work is careful and sharp differentiation of the pupils. In this city the classes were filled with a conglomerate mass of high-grade mentally deficient and backward children. These children had been assigned by a Binet tester purely on the basis of the Binet IQ and the school history. No study whatever had been made of the child's

[15] Even the competent, conscientious clinical psychologist, psychiatrist, or physician will assume such a grave responsibility, with hesitation and caution.

physical condition, and developmental and family histories. All children who failed to reach an IQ of 50—and sometimes children who exceeded 50—were automatically excluded. This school system continues this practice in spite of the fact emphasized by cautious psychologists for years that the IQ is simply an X to be interpreted in the light of all the available relevant facts, that the error of the IQ in individual cases may vary from 5 to 25 points, that many facts have been published showing that children of less than 50 IQ can be trained,[16] and that an IQ from one type of test material is not an accurate measure of improvability along all lines. When asked what became of the excluded children my informant replied she did not know but believed that a small number were placed in institutions. When asked why these children were excluded at all, in view of the declared policy of the public schools and of education associations, that "the schools exist for all the children of all the people," she replied that they were untrainable. When asked to define what she meant by "untrainable," and to present evidence that all children below a Stanford-Binet IQ of 50 were untrainable and therefore, rightly, should be excluded, she indulged in the kind of bald generalities in which all engage who base conclusions on assumptions and preconceptions instead of definitely ascertained facts. This occurred in the year 1928 in a school system which advertises the fact that it possesses one of the best systems of special classes in the country.

RACE DIFFERENCES IN DISTRIBUTION OF IQ'S

With very few exceptions the colored children selected for examination rated somewhat lower than the white children.

[16] G. J. Veith has recently shown that mental defectives of less mental ability than those whose cause I have for years espoused can be trained not only to dress themselves, but to recognize names and letters, sew carpet-rags, make various kinds of rugs, braid, weave, make lace, etc. Training the Idiot and Imbecile, Journal of Psycho-Asthenics, 1927, 148–168.

The medians are uniformly slightly lower for the colored, the differences amounting to 2.9 IQ's in all the Ohio cities, 2 IQ's in Dayton, and 4.4 IQ's in Warren.[17] The percentage of IQ's below 70 is greater for the colored in all cities, the difference amounting to 7 per cent in all the Ohio cities, 5.6 per cent in Dayton, and 10.7 per cent in Warren. For children below 50 IQ the excess of colored children amounts to 0.6 per cent in all the Ohio cities and 2.1 per cent in Dayton. There is no difference in Warren. For IQ's below 35 the excess amounts to 0.7 per cent in all the Ohio school districts, and 1 per cent in Dayton, while in Warren the excess is among the white children. On the other hand, there are more white than colored children with IQ's of 90 and above. The difference amounts to 7.6 per cent in all the Ohio districts, 7.1 per cent in Dayton, and 8.7 per cent in Warren.

Why are the colored children selected for examination of slightly lower capacity (in terms of the Binet IQ) than the white children? Is it because of the tendency to give the colored children the benefit of the doubt as many had come from the South where they had obtained little schooling? Is it because the teachers set more lenient standards of proficiency for the colored pupils, on the assumption that they have no right to expect them to do as well as the white children? Is it because negro children as a race rate lower in intelligence? Or do they merely rate lower in verbal intelligence tests? The experimental studies of the intelligence of colored children have almost always showed that they make lower scores than white children, but these studies have practically always been based on intelligence tests of the verbal or linguistic type. Our experience in the clinical examination of colored and white children during a period of almost two decades has led us to believe that the ratio of feeble-mindedness (using the word as a socio-industrial concept), as determined by synoptic studies, is not markedly greater among colored than among white children.

[17] The data for St. Louis are not analyzed for the reason given in the first foot-note in table 1.

SEX DIFFERENCE IN THE DISTRIBUTION OF IQ'S

Although the data from the different school systems are not entirely consistent, the girls selected for examination ranked lower in ability than the boys. For, although the modal ten-step interval is the same in three tables (St. Louis, All Ohio, and Dayton), higher for the boys in two (Greenfield and Warren) and lower in only one (Miami County), the proportion of boys of IQ 90 and above exceeds that for the girls except for All Ohio and Miami County. With few exceptions the deciles are higher for boys than for girls except in Miami County. While there is a slightly greater percentage of very low grade boys (below IQ 35) in all tabulations except for Miami County and Warren, the proportion of girls is greater for IQ's below both 50 and 70. The proportion of girls below IQ 50 is greater in all tabulations except for Greenfield. The difference ranges from 0.4 per cent (Miami County) to 10 per cent (St. Louis). The difference is more pronounced for IQ's under 70. The percentage of girls below 70 is distinctly higher except in Miami County; the differences amount to 29.9 per cent in St. Louis, 19.6 per cent in Greenfield, 11.7 per cent in Warren, 11.5 per cent in Dayton, and 6.3 per cent for All Ohio.

The median IQ is lower for the girls in all tables except one (Miami County; Oxford is not considered). The difference varies from 2.6 IQ (All Ohio) to 6.7 IQ (St. Louis).

In earlier publications we have pointed out that the percentage of feeble-mindedness among the children examined in the St. Louis Psycho-Educational Clinic during a period of seven years was uniformly higher for the girls, the excess being as follows:

Excess of feeble-minded girls over boys

	1914–15	1915–16	1916–17	1917–18	1918–19	1919–20	1920–21
Per cent	14.1	14.5	15.7	21.9	27.9	1.7	14.1

With the exception of one year in which the ratios are approximately equal, the percentage of feeble-mindedness is from 14.1

to 27.9 higher among the girls than among the boys. Similar findings have been reported by others.[18]

Why do the girls referred for examination as candidates for special classes for deficients rank lower, relatively, in mental capacity than the boys? Certainly it is not due to the fact that girls tend to rate lower on the Binet than boys, for a slight tendency in the opposite direction exists. The explanations usually offered (as already pointed out) are that the girls are permitted to remain in the grades because they are less troublesome than the boys, because the curriculum better suits the needs of girls than of boys, and because the principals and teachers are reluctant to arouse the animosity of the parents who, they believe, will interpose greater objections to the transfer of their daughters than of their sons to special classes. Whatever the correct explanations may be, our findings at least suggest that were a larger number of female pupils referred for examination, the greater incidence of boys in special classes for the mentally deficient would be reduced to some extent.

VARIATION OF IQ WITH CHRONOLOGICAL AGE

The alleged merit of the IQ is that it supplies a measure of brightness which always has the same significance. That is, an IQ of 50 means exactly the same thing whether the child is three, six, or twelve years of age? But does it? Many years ago in analyzing thousands of records our suspicion was aroused that a given IQ did not possess this constancy of meaning for children of differing chronological ages, for the results showed that the older the group chronologically the lower the IQ tended to be.[19] That this should prove to be the case with mentally deficient and backward children was to be expected, since they develop at a retarded pace, but that it applied also to our normal group caused surprise. We were inclined to attribute this phenomenon to imperfections in the 1908 and 1911 Binet scales, especially to the fact that the tests above age ten were too few and too difficult. But later we

[18] Hollingworth, op. cit. p. 13.

[19] Problems of Subnormality, 1917, 256 ff. and 267 ff.

obtained similar results with the use of the Stanford scale.[20] Now we again find the same phenomenon with the Stanford Binet based on a much larger number of cases. In all tables, with scattering exceptions here and there, the median IQ tends to decrease with descending chronological age. (See tables 5, 10, and 15.) The decrease from the youngest to the oldest groups is in some cases very marked.

Is the decrease due to the fact that the younger children reported for examination are brighter than the older ones; or to the fact that the Stanford Binet tests are easier in the lower ages than in the higher ones; or to the fact that a given IQ does not have a stable significance for children of varying chronological ages, owing to the "slackening in the rate of normal mental growth" with increasing chronological age, in consequence of which the IQ cannot be accurately used without a corrective formula, as suggested in 1917.[21]

[20] The value of the Intelligence Quotient for Individual Diagnois, Journal of Delinquency, 1919, 109 f. Clinical and Abnormal Psychology, 1927, 205 f.

[21] Problems of Subnormality, 269; Journal of Delinquency, 1919, 122; Clinical and Abnormal Psychology, 206.

THE USES AND ABUSES OF THE QUESTIONNAIRE PROCEDURE[1]

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There has been considerable interest shown in the status of the questionnaire procedure as one of the tools of psychology. The author has already recognized the questionnaire as one of the established *procedures* and has given it a place in his schematic presentation.[2] Titchener traces its origin to Francis Galton, who very early laid down certain cautions in connection with its extensive use.[3] It is interesting to note Galton's four requirements: (*a*) the questions must be such as will be quickly and clearly understood; (*b*) they must admit of easy reply; (*c*) they must cover the ground of inquiry; (*d*) they must "tempt the co-respondents to write freely in fuller explanation of their replies and on cognate topics as well. . . . . These separate letters have proved more instructing and interesting by far than the replies to the set questions."

In the early days of American psychology, G. S. Hall stood sponsor for its continuous use. Many of his contributions embody results gathered by this method and his students have also made elaborate use of the method. Even today its influence is strongly felt in the transformed statements frequently found in mental test series to which it has been adapted. Although in much modified form it can be genetically traced to

[1] Read at the annual meeting of The Iowa Academy of Sciences, Fairfield, Iowa, April 26, 1929.

[2] Ruckmick, C. A. A schema of method. *Psychol. Rev.*, 21, 1914, 393–401.

[3] Titchener, E. B. *Experimental Psychology*, Vol. 1, Pt. 2, 1901, 387. Galton, F. *Inquiries into the Human Faculty*, 1883, 84.

many of the objective information tests such as 'self-rating scales' in current use in the field of individual differences and personality.[4]

The American Psychological Association through its various committees from time to time also has gathered a considerable amount of material through this channel. Information has been sought concerning the teaching of courses in psychology, preparation of the instructors, and the relation of psychology to other disciplines in normal schools, colleges and universities. Some of the attempts at standardization of method have used the questionnaires. The author was himself a member of one committee which tried to standardize psychological terminology. As a part of its investigation, it made extensive use of the questionnaire to discover the current usage of terms. In an earlier publication in which he collaborated with Titchener, materials were obtained through this procedure in order to determine the academic status of psychology.[5] More recently he has continued his inquiries in that direction on the basis of which statistical data and conclusions were published.[6]

In that year, however, there developed considerable opposition among psychologists to the promiscuous use of this form of

[4] A significant comparison has recently been made between results obtained by the Pressey cross-out test and a questionnaire based upon estimates of personal characteristics supposedly covered by the Pressey test and filled out by the same individuals in both cases. The evaluation of the correlations between the results of the questionnaires and the results of the cross-out test was almost zero. The reliability of the cross-out test was .7 and that of the corresponding section of the questionnaire .6. While these results bear somewhat on content as interpreted by the two procedures they are, nevertheless, significant as an instance of a critical survey of mental testing as compared with the old questionnaire approach.

For further details the reader is referred to: Flügel, J. C., & Radclyffe, E. J. D. The Pressey cross-out test compared with a questionnaire. *Brit. J. Med. Psychol.*, 8, 1928, 112–131.

[5] Ruckmick, C. A. The history and status of psychology in the United States. *Amer. J. Psychol.*, 23, 1912, 517–531.

[6] Ruckmick, C. A. Development of laboratory equipment in psychology in the United States. *Amer. J. Psychol.*, 37, 1926, 582–592.

inquiry, and at the twenty-third annual meeting of Experimental Psychologists, the following resolution was unanimously adopted:

"Resolved, that this meeting deplores the increasing practice of collecting administrative or supposedly scientific data by way of questionnaires; and that the meeting deplores especially the practice under which graduate students undertake research by sending questionnairies to professional psychologists."[7]

Promptly thereafter there was published a code of seven rules to guide professional psychologists in their conduct by way of answering promiscuous questionnaries.[8] That psychologists, educationalists and administrative officers are unduly beset through the mails by undergraduate, graduate and post-graduate seekers after truth can not be safely denied. This practice is not limited to only one discipline but the affiliations of all subjects are such that no one science is free from inquiries made on the part of an increasing number of other sciences, non-scientific disciplines and enterprizes and so the race goes merrily on. At the present stage of scientific development in psychology possibly the opportunity comes for a more or less disinterested review of the situation.[9]

The criticism concerning the untrained or half-trained type of observer who is called upon to report in this procedure was

[7] *Amer. J. Psychol.*, 37, 1926, 468.

[8] Boring, E. G. *Amer. J. Psychol.*, 37, 1926, 633.

[9] The significance of the questionnaire procedure in the history of psychology may be gathered to some extent from a perusal of the index to the first thirty volumes of the *Amer. J. Psychol.*, now published separately. While this does not include all of G. S. Hall's psychological investigations, it is fair to assume that most of the important ones were gathered in this, his most favored journal. Counting his own contributions and those of other psychologists, we find the questionnaire procedure used in as many as forty studies during the first thirty-three years of its existence (1887–1920). In a very few of these studies was the procedure barely touched upon: in most of them it was the principal instrument of approach. The Index gives a clear-cut picture of a great variety of topics that were treated in this manner.

already voiced three decades ago by Stanley.[10] He points out very definitely the fact that psychology is practically the only science that frequently resorts to this procedure and joins forces with Miles,[11] an earlier writer, in doubting its scientific value. While Miles got a rather high consistency between the two sets of answers through the method of 'double questioning' where answers were required from the same group but on a subsequent occasion when their earlier answers were no longer remembered, she too questions the scientific value of the results. Her opinion is that the returns have most value as suggestions to the investigator. She agrees that the procedure must give way to more controlled methods.

Let us proceed, then, to consider in order the chief weaknesses of the questionnaire. At least five scientific difficulties or possibilities of error occur to the writer:

1. First of all, the procedure stresses explicit categorical answers. Galton was wise enough to invite comments which would condition or enlarge upon the specific replies; but in the author's experience most formulators of questionnaires invite and encourage categorical answers for the simple reason that they can be more readily classified and statistically treated. From the scientific point of view, this is one of the greatest sources of error. Immature instructors in our sciences relish dogmatic statements. They are most disturbed if they can not give specific facts, crisp bits of information and smoothly running formulae. They have proceeded only as far as the *pons asinorum* of Euclid. These explicit statements are the currency which the elementary student mind uses in the barter of the class-room, but the deeper one goes into one's subject and the more one really knows about his science, the more difficult it becomes to give, for instance, the specific answers of the type that are frequently required in our intelligence tests and in many of our objective examinations. This has

[10] Stanley, H. M. Discussion: remarks on tickling and laughing. *Amer. J. Psychol.*, 9, 1898, 235–240, (*v.* 239–240).

[11] Miles, C. A study in individual psychology. *Amer. J. Psychol.*, 6, 1895, 534–558.

been the invariable experience in mental testing with highly educated and professionally matured individuals. It is simple enough to put the question whether the checker board is black or white and to require the answer 'yes' or 'no,' 'true' or 'false.' It is much harder to explain that the color or the tint of the board has little to do with its essential characteristic. And the world of scientific fact is infinitely more complicated than any checker board.

This is the situation that confronts the questionnaire. Local conditions and individual circumstances vary greatly. To expect the individual who is replying to make a crisp, concise, and categorical analysis of such circumstances that is at once accurate and dependable is very likely to contaminate at their sources the data thus derived. We have therefore a curious paradox. If the person who replies is an expert, the chances are that he will refuse to be explicit or categorical in his answer; if on the other hand the respondent is quite immature, he can afford to be and will very likely be explicit and categorical in his answer, but the information may be wholly untrustworthy! The expert is furthermore a jealous guardian of his own reputation and refuses to be so succinctly quoted under the limited or undefined conditions of the questionnaire. Sometimes indeed the questions are so equivocal or ambiguous as to be genuinely misleading in effect.

2. This leads us at once into the second source of error: the uncontrolled and uncontrollable nature of the replies. Several carefully planned studies have indicated the force of negative *versus* positive instruction. In a section of the Downey will-profile test, for example, one is not altogether certain because of large individual differences whether the individual will respond to the suggestions given in a positive or a negative way. Because of these large individual differences there is likewise no telling whether the positive form of the question or the negative form has a direct bearing on the answers given. If we were quite sure that the influence would be constant with all respondents, of course, we would simply then have a constant error. As a matter of fact, it is quite

probable that, owing to individual differences in reactions, some individuals will be inclined to answer one way, others in quite an opposite way. It is exceedingly difficult so to frame a question as not to convey either a positive or negative instruction. This has been much discussed in connection with the cross-examination type of testimonial report. A skilful lawyer, by ingenious methods, may lead a witness to say almost anything that pleases the cross-examiner. The best we can hope for is that in the large number of returns the two opposite tendencies will cancel one another, but that may be a gratuitous assumption which has had no empirical proof.

Besides this error which lies in the necessary form of the question, there are sometimes such crude suggestions given by unscientifically trained individuals who frame questionnaires that the results can not help but be biased through accompanying letters or general instructions. The writer well remembers a recent experience when he was asked to fill out a questionnaire concerning his religious beliefs. An attempt was made to compile data concerning the religion of scientific men. The letter quoted at length some radical statements made by a famous scientist concerning his religious convictions and concluded with the suggestion that the writer should be equally frank in his answers to the questionnaire. Of course, this is suggestion at its worst, but it is nevertheless symptomatic of other influences which may be conveyed from current literature, recent conversations and other sources not adequately controlled in the inquiry. Besides, the seriousness with which the replies are made varies greatly even to the vanishing point of lack of good faith. The effect of the demand for a signature to establish good faith must in no case be overlooked.

3. The next possible source of error lies in the uncertain nature of the interpretation that is put upon the results. Here, as in other scientific work, the integrity of the compiler or investigator must be considered; but at this point there is no great difference between interpretations of results by the questionnaire method as over against data obtained by any other procedure. Many of us have felt the desire to go to the origi-

nal protocol in order to verify the conclusions drawn. In view of the unsystematic type of data obtained by the questionnaire, the error becomes increasingly large, however, and the equivalent of the original protocol is altogether lacking. Few investigators are willing to go behind the categorical replies when tabulations are made. From the writer's own experience there is a considerable tendency in tabulating the results to overlook minor inconsistencies and the variable circumstances which have surrounded the reply. Certainly, one is almost compelled by the *Aufgabe* of the tabulations themselves to squeeze round replies into square holes and to disregard the various conditioning factors that are nevertheless operative.

4. A fourth class of error lies in the direction of the usual statistical treatments accorded returns from the questionnaire. Not only is the statistical treatment illusory in itself, often lending a sort of false glamor to the investigation, but promiscuously obtained results from doubtful sources are often given an artificial dress through quantitative measures. However highly statistical treatment may be rated, the results are often not much better than their origin. Many figures simply come from such poor stock that their subsequent environment is helpless to change them. Of course, some statistical treatments tend to indicate or to eliminate uncontrollable errors which have crept into the investigation, but many results should not have been statistically treated at all and often results statistically stated in conclusions are thereafter all too glibly quoted.

5. A last source of error which has not received sufficient attention is the significance of unreturned questionnaires and replies left blank on the specific questionnaire form. Is it altogether safe to assume that these omitted responses can be dropped from the count? It is quite possible that with certain types of questions, contrary to the adage that 'silence gives consent,' failure to reply may, indeed, be also sometimes a negative reply. Many respondents may feel personally aggrieved at the nature of the inquiry and may thus refuse to

turn in replies that would very likely be negative. The mortality of questionnaires is almost always high, but very little seems to have been done about it in the treatment of results. It is an unsafe assumption to consider these unreturned replies as being one-half positive and one-half negative.

Toops has recently studied the effect of increasing the returns from a distributed questionnaire through the use of 'follow-up' letters. In one instance he was able to raise the returns from an original 52.7 to 100 per cent. In that case he found one of his conclusions, based on the first returns, unaffected by subsequently available data. But it is not safe to make a similar deduction in regard to other conclusions. He has made some very significant studies, however, concerning the various factors which govern the failures to respond.[12]

1. Turning now to the advantages, one must concede that time is the major significance of the questionnaire form. Thousands of individual returns may be gathered when, because of the exigencies of both space and time, it would be next to impossible to gather quite nearly as many cases by any other procedure. In other words, the scope of the inquiry is very large. If nothing further were to be done about it, we must concede to this procedure the possibility of a bird's eye view, which may give an expanse of knowledge with a minimum of detail. For this reason, as Titchener has already pointed out, norms or averages can be deduced which no other procedure can as easily establish. It is quite likely that this feature has worn out the patience of our professional men. With little energy, time and financial outlay a questionnaire may be devised and distributed quite widely over a given geographical area. The investigator has thus enlisted the services of great numbers of busy people either through their own interest in the investigation or through their inherent good nature. In a day which

[12] Toops, H. A. Validity of the questionnaire method. *J. Person. Res.*, 2, 1923, 153–170.

Toops, H. A. The returns from follow-up letters to questionnaires. *J. Appl. Psychol.*, 10, 1926, 92–101.

compels specialization one's interest naturally becomes much limited and one's good nature is made subject to rational control; hence, perhaps, the resolution quoted above and the general negative laboratory attitude which is current in our better institutions.

2. A second point in favor of the questionnaire lies in its possibility of furnishing cues for further investigation. If the person responsible for the questionnaire is taking this means to survey a situation not otherwise capable of being brought to view, he will undoubtedly obtain many leads for intensive research. In other words, the questionnaire can be used as a sort of drag-net from which material can later be selected while other materials, thus gathered and not wanted, are thrown back into the stream of human experience. The procedure itself may lead to further scientific refinements. It is notorious that scientific psychology has through all these years failed to provide a better technique, for example, for the investigation of mental imagery, but we are hoping that some one will soon devise a procedure which may replace the questionnaire form.

3. A further advantage lies in the natural and inherent principle of formulation. A skilful person who undertakes to make a reasonably good questionnaire is naturally led to scrutinize the entire field from many angles. Much depends upon these original formulations and this preliminary envisagement. This crystallization of thought in connection with the main problem is a wholesome attitude for any investigator to take. The writer knows of no other procedure which compels so much forethought coupled with avoidance of irretrievable errors as does the questionnaire procedure. After the questionnaire is sent out, nothing can be done about errors of omission and commission in the form thus distributed. Laboratory procedures on the other hand, provide a constant corrective check and means of improvement throughout the experimental series.

It is obvious, therefore, that the questionnaire has both a place to fill and a handicap to overcome. Strictly speaking it is not an experimental method. One may call it a prescientific

procedure.[13] It is antecedent to and dependent upon further experimental research. When the questionnaire is made out by obviously inexperienced and scientifically untrained individuals, very little of scientific value can be hoped for. Under those circumstances, the author is quite in agreement with those who believe that answering it would be not only a waste of time, but conducive to misunderstanding and confusion of thought. Its abuses are notoriously dangerous and only when all other means fail should it be resorted to. The writer does not mean to question the historical place of the method and the value of data which have added to our psychological knowledge in the past, but he would stress the need of treading cautiously and of pressing ever forward to improved techniques in the future.

[13] At present the questionnaire seems to have considerable vogue in some disciplines, like education, sociology, and religious education which appear to be still on the prescientific level. It may be that as experimental procedures develop the questionnaire type of investigation is gradually cast off for better methods and that the maturity of a science can be measured inversely by the number of questionnaires which it sponsors.

CLASS SHOPPING EXPERIMENT

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In the fall of 1928 my class in business psychology undertook to carry out some buying experiments in the various business establishments in Denver. Each member of the class selected some article to be purchased. No one was under obligation to purchase the article but at least six trials must be made in six different establishments for the same article before any purchase was consummated. We recognized the psychological advantage of a good intention to finally buy the designated commodity and in over 90 per cent of the cases the purchase was finally made.

Each purchaser had definite written instructions on a dozen or more points to be noted and was requested to record carefully the entire transaction as soon as possible and to file a written report of each attempted purchase. The experiment proved of so much interest that it was later taken up by other classes until 120 different students were involved and the total attempted purchases aggregated 720. These included the purchase of 108 different commodities. Shoes were purchased by five different individuals; radios by two, and sweaters by three. These shopping experiments ranged all the way from toilet articles to fur coats, automobiles and furniture sets. Thus a great variety of stores and shops were visited.

The following are among the things to be observed and set forth in the report: form of greeting, neatness of salesman, promptness, cheerful or courteous manner, attention given to customer, positive or negative statements, initiative, enthusiasm, tact, knowledge of and attempt to explain the goods, whether name is secured and how, card presented, at what store sale was really made and why, things that created favor-

able impression or the opposite, closing remarks and how escape was made when no sale was consummated.

The above points have been summarized as far as statistical record could be made from the reports. A statement of the chief points follows:

FORMS OF GREETING

Two hundred twenty-two said: "Something I can do for you;" 145, no greeting at all; 105, "Something for you;" 75, "Do you wish to be waited on;" 24, "May I show you something;" 30, "Yesser;" 24, "Good morning;" 24, "What for you;" 17, "Hello;" 16, "Good afternoon, dearie."

Students reported how these greetings affected them and they were discussed fully in class. None of them seemed to be very satisfactory; yet they seemed unable to suggest others that would be more pleasing. They seemed to be more displeased with the manner in which they were uttered than with the content. A half dozen papers speak of the whole process as being "formal, flat, and forced." One gentleman says: "I entered P—— S—— Co. This time I did not intend to be trapped into opening the conversation. I waited a moment and received the regulation formal, dead greeting, "Is there something I can do for you?" I said: "Of course there is or I would not be here." Three girls protested against being called "dearie." Surely we have here an effort to form a human relation of considerable importance. Large organizations should study these situations and attempt to improve them.

INFLUENCE OF DRESS

On the subject of dress we shall later hear directly from the reports. The following figures were taken from the 720 reports. In 390 cases dress and appearance seem to have been satisfactory; 70 comment upon the untidy appearance of the salesman or saleslady; 42 mention the unfavorable impression made by the dress of the individual. In 11 cases the student did not like black; in 26 cases a distinct prejudice was created against the store by the appearance of the individual in charge.

One customer who intended to buy a suit of clothes entered Store B—— and afterwards writes as follows:

"I was met by a salesman weighing about 240 pounds whose appearance was so in contrast with the one I had just seen at M—— Co. He had no coat on, his vest was unbuttoned, and his shirt sleeves were in disorder. Everything about him gave me the impression of laziness. I was not deceived. He showed me a suit, but when I asked if he had anything cheaper, he replied in a tone which made me angry, 'You can't expect to get something for nothing.'"

PROMPTNESS OF SERVICE

Here we have a very favorable record. In 462 cases service and attention were prompt; 152 did not receive prompt service. In 42 cases this was reported as due to negligence and indifference. In 30 cases the clerk left the customer and engaged in conversation with another clerk. I append a few of the criticisms where attention and service seemed decidedly wanting:

(1) "I started out to fill an assignment, but selected the radio as the item I would shop for because I am actually considering the purchase of a new radio. I visited six different places. Every one of them, carrying a stock of radios, paying rent on floor space with one or more salesmen devoting their time to the business, and with undoubtedly considerable money invested in stock.

"One of the six places asked my name and one asked the section of town I lived in. Two of them devoted all of their talk to a bargain, but one of these two failed to tell me what the bargain was.

"Although I have practically no technical knowledge of radios, I don't think I got a single new idea from the six salesmen. Not one of them appeared to be interested enough in radios to inform himself sufficiently to make an interesting presentation of the merits of his particular line. In other words, my experience proved to be a wonderful demonstration of the woeful lack of even the elementary principles of salesmanship, and in a line where competition is so keen and the season so well advanced that only good salesmanship can possibly hope to produce results."

(2) "Third stopping place, I——'s! A lady chewing gum, but otherwise very pleasant looking, came up to me after I had waited for quite a few minutes while two other sales girls talked to each other about their own affairs instead of waiting on me. The saleslady asked me what she

could do for me. I told her. The lady then inquired, 'Do you want a cuff neck or with collar?' I replied, 'With a cuff neck.' She proceeded to show me two fancy red sweaters, which I did not care for. Then she asked, 'Would you rather have plain red?' 'Yes,' I said. 'I don't believe I have any plain red, unless there is one in this pile.' Finally she found some red sweaters in the pile and showed them to me. I said, 'They seem so light in weight.' Promptly she replied, 'They are light.' Then I said, 'I don't know whether I like this or not.' She just stood there and chewed gum. Of course I immediately departed."

(3) "Across the street at the D—— S—— Co., I found a poorly lighted room. A girl, with a green shade over her eyes, emerged from the dark end of the room, and as she came near to me she greeted me with a cheerful, "Good Morning," and then waited for me to tell her what I wanted. I too waited, waited until the situation became awkward. I could not get the 'Is there something I can do for you,' so once more I described the binder. This time I was quickly told that it was not a standard size. The size larger and the size smaller were named. I ventured to say that the 8 x 10, was also standard and used as a Student's Note Book. She seemed indifferent and I was permitted to leave without further comment being made by either of us."

(4) "All the clerks were neatly dressed, and for the most part, were very nice to me. In all cases but one their courteousness seemed to be real, and that they really wanted to satisfy me. None of them tried to get my name. One told me that they would have some new stock in the first of the week and that they would be glad to have me come in and see it."

(5) "Then she said, 'Would you be interested in black?' I said 'Yes, if I could see something I liked.' By this time I noticed a change in her. I think she felt like telling me that I never would see anything I liked. She had become tired of showing me so many. She finally said, "You can look through these black ones and see if you like them." I looked at a few and remarked how I liked one of them. But she did not try to interest me. She just stood there, and said, "Yes, they're all pretty." But I said I thought I would look around some more before deciding. She just shook her head. I thanked her and walked out."

(6) "The next store I entered was M—— T—— & B—— Co. The saleslady was not dressed neatly and she was chewing gum as fast as her jaws would go. She asked me what I wanted and then said, "All the bags we have are on that counter."

(7) "I next went to The K——. I went in the coat department, stood there and waited and waited. No one paid any attention. I finally went up to one of the clerks and said, "Will you please wait on us?" She did not say a word but started to walk over toward the coats. We followed. She brought out some coats of various kinds, not saying a word all the time. She put them on a rack near us. I had to go over and wait on myself. After bringing out about five coats she said, "I believe that is all I have in your size. You had better go to the Junior department." I didn't know whether to be flattered or insulted, but did thank her and walk out. I never was so disgusted in my life. She did not say a thing to me about the coats she did bring out."

KNOWLEDGE OF GOODS

Since only 136 out of the 720 sales individuals made any attempt to explain goods sold, the absence or presence of knowledge concerning the goods sold cannot be determined. In literally hundreds of cases it would have served a good purpose and in many cases it was sadly wanting. As one reads these sales descriptions he gets the impression that the lack of the use of sound knowledge concerning the goods sold is the most outstanding defect. We can best realize this by letting the student's own description tell the story for and against.

(1) "One day last week I decided to buy a pocket-book and so I entered a place where leather goods were sold. As I came in a young man was standing at the counter and asked me what I wished. I said that I would like to see a practical purse that I might use for school wear. Even though he was neatly dressed and seemed to be interested in making a sale he did not know much about pocket-books and since I did not think he had any business selling ladies' merchandise, I was not impressed from the start.

"The last place was The W—— L—— G——. As I entered a very attractive saleslady greeted me. She said, "May I assist you?" I told her what I wished and she agreed with me that black was the most practical color for general wear. She brought out many purses. All of them were black in color. She was careful to get a convenient size and also styles that were appealing to the eye. Each time she showed me a purse she said, "How does that appeal to you?" In every instance she gave a short explanation about the leather, the make, the lining, and everything concerning the pocket-book. She stressed the fact that each one was guaranteed and they would absolutely repair anything if the purse did not prove to be satisfactory. I picked out one pocket-

book and told her I would take it. It was raining outside and she noticed I was carrying some books and so she offered to wrap everything in one bundle. I thought that showed she was interested in satisfying the customer so that I would come back again."

(2) "The sixth place I went was D——'s, and here the salesman had enough sales talk to make up for the other five places. A very enthusiastic young man waited on me, and he seemed very interested in the subject of furs. I couldn't think of enough questions to ask him and so I went on trying on coats while he talked. He told me where the furs came from, the time of year they were taken, the preparation, the matching, and why one coat was better than another although they looked alike. After forty-five minutes of this I said that I wasn't going to buy a coat right then, and I would come in again later. He gave me his card, and said he would be very glad to wait on me when I came in again. He also took my name and address."

(3) "I chose fur coats for several reasons: first, and not least, because I knew that there was no danger of my being talked into buying one. Also, I thought that a fur coat is a rather expensive thing, and that a salesman would probably know quite a bit about them in order to sell them successfully. I was rather disappointed in this, however.

"The next place was D——'s. The girl here was certainly not cut out to be a saleswoman. As I entered, I asked for a certain girl to whom I had been referred—but was told that she had been married last week; so she, the lady who had met me, took me to a booth. I told her what I wanted and she brought several. She flatly contradicted me on three occasions, and since I don't appreciate that—even if I might be wrong—thought it quite unnecessary. I told her that I liked fluffy collars. "Oh no, you don't," she said."

(4) "The very dress for you." I said, "Is it velvet? If it isn't I don't want it." Without saying what it was she walked away. When she came back she had a dress in her hand that wasn't velvet. "Here," she said, "Try that on. It is the prettiest dress we have in the store. I know it will look beautiful on you." Then I put it on. "There," she said, "is a real creation. You'll never be happy without that dress." It was absolutely the dress I didn't want, but I bought it and like it very much."

(5) "The next store was the K—— and C——'s. I thought I would get a good sales talk here, but I was disappointed. A neat appearing girl came up and said, "Something?" "Yes," I replied, and told her what I wanted. She replied that she had just one pair in stock. She showed them to me, laid them down and walked over to talk to another

clerk. After five minutes she came back and asked if I liked them. "No," I replied, and left.

"I went back and got those at L——'s, and they were the ones I liked best and the lady there gave me the best sales talk."

(6) ". . . . She brought out some lovely ones. She just gave them to me to look at and didn't say a thing so finally I told her that so many people said the antelope looked bad in such a short time, it rubbed smooth quickly. She said that if it was given any care it would last a long time. There was one bag there that I would have had a hard time refusing if she had tried to sell it, and probably I would even have gone back for it."

(7) "The first place was C—— C—— store. Here the salesman greeted me with a cheery "Hello," and "What can I show you?" "A tie," I replied, and he at once began to take out several different priced ties. He told me of the material in the ties, and told me that they would hold their shape because they were hand made and that only a hand made tie can be made to hold its shape. He told me that the latest and most popular tie was the Mogadore.

"I was stuck for I saw a tie which I liked, but I had five other places to go. I had difficulty in leaving and I finally went back and bought a tie there and then told the clerk why I did not buy at first. He seemed pleased."

(8) "D—— & F——. First she picked out one, saying that this was a Cordova make fold of steerhide which she said was probably the toughest leather used in bill-folds. There was a design on this one and she explained that this was made by artists, and that special tools were used. Next came an alligator skin and this was followed by a pig skin bill-fold. I raised the objection to its being silk-lined. She explained that the silk used was the most durable silk it was possible to get. She then added this point and I thought it a good one: namely, that the silk-lined fold was much lighter weight and made a much thinner package, and was not nearly as bundlesome as one with leather lining. During the course of her sales talk she got out two or three combination sets and tried to interest me in one of them.

"She was very courteous and knew her goods so well that I felt rather guilty for taking so much of her time, so I asked for the special two-size bill-fold.

"I bought what I had not expected to buy and was well pleased."

(9) "At M——'s I was just about to leave because the hat I really wanted was too small. She said to wait; she had another one I might like and she brought out one that was the same in make and style as the

one I had liked at W——'s; so I asked her the price and it was two dollars cheaper than the other one had been. So I began to have more confidence in what she had told me. She tried the other three on me again and I bought one of the ones that I didn't like at first. The hat has been as good as she said it was, so when I want another hat I will probably go back to this place."

(10) "She knew radios, told me what a big concern the Atwater Kent manufacturers were. She got a little pamphlet and explained the different kinds and the prices thereof. She figured up the prices of the different sets when they were complete. She knew the prices and the radios she was selling and evidently had been a saleswomen all her life. She emphasized the fact that I should take advantage of the Denver Foursquare Credit plan. She was very good. She gave me her card and told me that she would be very pleased to sell me a radio when I got ready to buy. She also said that she would take care of packing and shipping the radio. She was so courteous, and kind, and business-like that it was a temptation to buy the radio outright and not wait."

(11) "In all my conversations with salespeople in these stores their prime motive seemed to be to sell a hat and collect the money—not to put too much time in on it at that. The appeal to my taste did not seem to be the chief desire of any of them. In only one store was I told of the shape of hat that I should wear—that is one with a wide brim; and I had mentioned nothing about that request to that salesman who volunteered the information. For that reason, I believe the salesman at P—— B—— demonstrated more interest in me and my wants than any of the others did. This salesman's interest in his customers and their wants commends a return visit to his store whenever the customer may be in the market for the same or other merchandise. I cannot but feel kindly toward that store."

(12) "My last stop was the fatal one. This was at S——'s. I knew the clerk in there. He asked me what he could show me. I told him I was looking for gloves. The first pair he brought out was the very thing I had been looking for. He sensed that I liked them, and started in on his sales talk. He said that they were the finest grade of Piccury on the market. I told him I thought they were Pig Skin. He said that was the common name, and was the quality that was put into the cheaper gloves of the same appearance. The animal was found only in Australia, and the skin had a special tanning process. Also, that this was the real color and that they had not been bleached with acid. He told me also of the quality of workmanship, hand sewn, etc. I asked him how much they were and he said that they were only ten dollars. I said that I hadn't expected to pay that much. He told me that the gloves were a real value and not to confuse them with the so-called Pig Skin glove that

sold for five or six dollars. He convinced me of the value, and I told him I would take them."

Several students appended to their reports a general conclusion of considerable significance. The following one is among the most significant:

"*Conclusions:* I could not help but note in these observations a few facts which impressed themselves on my mind concerning salesmanship. (1) I believe that we as customers and buyers are influenced to a certain degree by the '*atmosphere* of the store.' We have certain prejudices and ideas about them from various dealings with them. (2) Black makes the best and neatest color for sales people to be dressed in. *Uniformity in color* in this factor adds to the impression made upon the customers. (3) An attitude of *service*, of *willingness* to serve, and a pleasant *personality* cannot help but influence the customers. (4) A *knowledge of the goods* to be sold, and a *desire to impart* this knowledge are of inestimable value. (5) A good sense of tact, and a normal command of the English language are valuable to the salesman. Undoubtedly these could be enumerated to suit the buyer, to enable him to help the salesperson likewise, but here we are considering the salesmanship end of it."

Some points of minor importance may be noted. In 36 cases there were comments on the entire lack of *tact* in handling customers. The initiative ability of 68 salesmen attracted attention. Only 25 out of the entire 720 made discouraging remarks about competitors. Thirty-six purchases were made by students who started out with no intention of buying. Of those who did buy, more than half were sold in their own minds before they reached the sixth store. Seventeen were referred to other salesmen.

Definite prejudices were created in 62 cases. Nineteen students bought something different from what they had planned to buy. Twenty-one clerks were described as chewing gum. The names of the purchasers were secured in only 54 cases, and cards were given the customer in 38 cases.

THE CUSTOMER'S EVASIONS

The methods by which the customer managed to avoid a purchase were many and varied. Some definite deceptions

were used but perhaps not much more serious than what takes place daily. The most common method was that of finding some fault with the commodity, or promising to look around and call again. Another was the excuse of bringing a friend or perhaps the customer's mother back to look at the desired article. One gentleman says:

"I think that I was most embarrassed in getting away from the salesman in G—— D——'s, and the elderly gentlemen at the R—— C——. Had I not been on this assignment and happened in either of these stores I would have purchased a hat."

Another says:

"I tried to get away with the story of bringing my sister down to look at the various models and have her decide as to which she would rather have. This did not work out as well in this case as it had in several of the other stores where I had little or no trouble in getting out. He then wanted to send out a piano on approval and we would have the privilege of returning it without cost if we so desired."

In connection with this study it is interesting to note the results of a recent investigation in the University of Oregon on why customers quit trading at grocery, drug, or dry goods stores. The per cent of causes is as follows:

Cause for making change	*Percentage of replies*
High prices	14
Delay in store service	10
Poor quality of goods	10
Indifference of sales people	9
Haughtiness of sales people	7
Errors	7
Overinsistence of sales people	6
Attempted substitution of goods	6
Tricky methods	6
Store arrangement or appearance	6
Wrong policies of management	6
Misrepresentation of goods	5
Reluctance to exchange goods	4
Ignorance of goods	3
Poor advertising	1
Total	100

It appears that poor salesmanship was the direct cause of 26 per cent, the indirect cause of 64 per cent.

I am well aware of the fact that there are certain psychological aspects of such an investigation that must not be overlooked. In many cases it was difficult for the customer to appear perfectly normal. This condition may have been sometimes detected by the shrewd clerk. But this was overcome as far as possible by having the customer really intent on buying some place. However, the reports of those who did not intend to buy do not differ in any essential way from the others.

There can be no doubt that the bare fact of calling the attention of salesmen and salesladies to these points of greatest value and of short coming would produce good results in most establishments. Some of my students, in defense of the clerk's failure to take more interest and know thoroughly the goods to be sold, emphasized the low wages they receive. There may be some basis of fact here. But to all such individuals I feel like calling attention to that keen statement of Mr. Hubbard's: "He who never does more than he is paid for will never be paid for more than he does."

EFFECT ON THE CUSTOMER

During the regular experiment many of the 720 reports commented upon the agreeable or disagreeable impression made on the buyer. As already stated, in sixty-two cases distinct prejudices were created against the firm. Twenty-six of these unfavorable impressions were due to dress and appearance of the clerks; nineteen to "absolute ignorance" of what the individual was attempting to do. In fourteen cases serious doubt as to the honesty of the firm was created.

Just about one year has gone by since the experiment began. The fitting suggestion of finding out what effects still remain in the minds of these experimental shoppers came to me some time ago. I have been able to establish contact with fifty-two of the original one-hundred-twenty shoppers. These have responded to the following inquiry: What effects have you noticed as a result of your shopping experiments? Was it

detrimental or beneficial? Did it change your places of shopping?

Eleven say it has made no difference—just the same effect other buying has, while forty-one give a variety of effects. Twenty-four say they have become more at ease in buying and feel less likely to have someone impose on them. Fifteen have definitely refused to shop at firms against which prejudice was created, and seven comment on the strange psychology by which prejudice against a single clerk will be extended to the whole establishment.

In this connection I have often related an experience of my own. I entered one of our largest dry-goods stores and asked for an Ironton collar. The young man pointing to the case said, "Right there it is." I said, "No, that is not the Ironton. It is one-eighth inch higher." He replied, "Well, I know. I have been selling collars for a long time. It is just like it." I said, "Well, sell it to someone who knows no difference." I passed that store hundreds of times and never entered it for ten years. I was ashamed of my own conduct; and once unknowingly told the circumstance in the presence of the chief owner. He at once invited me to speak to his entire staff.

In twenty-five cases the places of shopping have been modified; thirty-six say they received personal benefit from the experiment in various ways; twenty say they have ceased to rely upon their own judgment and have a definite tendency to seek clerks who know their goods. Five students have commented upon the skepticism created by the general reports. At least ninety per cent feel that even under existing conditions salesmanship can be greatly improved. I am fully convinced that there is need of a definite study of the "professional shopper." The technique of procedure will be difficult but it can be done.

THE VALUE OF THE PHOTOGRAPH IN THE SELECTION OF TEACHERS

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The origin of this problem lay in the general practice of requiring candidates for teaching positions to submit their photographs with their applications. There is a widespread belief among people that they can tell a great deal about a person by looking at him, or in lieu of the person himself, at his photograph.

The results of experiments with photographs to date have been inconclusive and often conflicting. Pintner (7) had five groups of judges rank 12 boys for intelligence from their photographs. These rankings had a correlation of +.16 with the rank as determined by the Yerkes-Bridges point scale. He concluded that a five minute interview would be better than a photograph. Anderson (1) had 12 judges rank 69 people as to their intelligence from their photographs. Their ratings had a correlation of +.27 as found by the Bureau of Personal Research adaptation of the army intelligence tests and were attended by many contradictions. Hollingworth (4) had 10 judges evaluate some of the commoner character traits from a set of 20 photographs and found considerable agreement among them in the case of intelligence with an increasing divergence through perseverance, kindliness, conceit, courage, humor, and deceitfulness. These judgments were compared with those of 25 people who had known the subjects intimately for at least two years and in the case of some traits resulted in a fairly high correlation (+.65) while in others it was much lower. It might be pointed out that the judgments of these 25 were purely subjective and hence the correlations would tend to be higher than if the various traits had been determined objectively. Laird

(6) submitted 5 photographs of young men to various groups of judges to be rated according to intelligence and his results led him to say "No one yet has been found who can consistently do 10 per cent better than chance in estimating intelligence from photographs." Chang (2) found high correlation between teachers' estimates and teachers' marks (both largely subjective) but a low one between the estimates of a large number of psychology students from photographs and the ratings as determined by intelligence tests.

Gaskill, Fenton, and Porter (3) submitted 12 photographs to 274 students in psychology to be ranked according to intelligence. Compared with the ratings as determined by the Stanford Revision of the Binet Scale correlations were obtained ranging from +.45 to +.83. These are the most favorable results yet found for those who think they can read qualities from photographs. More recently Landis and Phelps (5) tested the ability of 20 undergraduates—all of whom had had an elementary course in psycohology—to predict success or failure from the photographs of 40 members of a graduating class of a standard college of some 30 years ago. They were then given recent photographs of the same men and were asked to determine the relative success or failure the men had actually experienced. The estimates were then compared with the actual attainments of the men as shown in short auto-biographies of the group as published on the 25th anniversary of their graduation. The 40 men represented those who had gone into law, medicine, education, or engineering. The judges were asked to assign these men to the vocation in which they were actually engaged. In none of the tests were there correlations sufficient to warrant the use of the photograph in determining such facts as were here sought.

Teigs (8) reports an experiment conducted at Minneapolis in which 11 principals and supervisors of schools attempted to predict teaching ability from the photographs of 20 applicants for teaching positions. The evidence seemed to show that the photograph was of little value when used alone, though when taken with other bases of judgment, as letters of application,

recommendations, etc., it helped to a composite judgment more accurate than that from any other means used alone.

These tests, on the whole, show little agreement. The results are conflicting and divergent. Furthermore, it will be noted that they are largely laboratory experiments, with the judges untrained in the particular thing they are trying to do. Because untrained students, for instance, cannot judge traits accurately, must it follow that those who have made it a business cannot do so? While college students might not agree as to what disease a given syndrome of symptoms points, would it be as meaningless to a group of trained physicians?

It was believed, therefore, that there was a place for a study dealing with an actual life situation as found in the general requirements of school boards referred to above. In this belief the following experiment was undertaken.

THE PROBLEM

The problem was to discover whether in the hands of those who actually do the hiring and placing of teachers the photograph has any value in determining their choice. There was no attempt to get a detailed analysis of character or to pick out any single trait. It was a matter entirely of general impression. The judges were simply asked to rank the various individuals according to their desirability as teachers from the impressions they received from their photographs.

THE METHOD

For this study, sets of photographs of teachers[1] were sent to a number of representative men and women actually engaged in hiring teachers. Good prints of all were used. A set consisted of 4 groups of 6 pictures each. Group W was made up of photographs of superintendents or principals (male), group X of high school teachers (female), group Y of teachers of grades 3 to 8 (female), and group Z of teachers of kindergarten or grades 1

[1] As most of these teachers are at the present actively engaged in the profession, it seems inadvisable to publish the photographs.

and 2 (female). The six persons in each group were called A, B, C, D, E, and F. All in a given group had had practically the same academic preparation and all had had three or more years experience. Complete records of each, including considerable correspondence from people out in the field where they had been working, are on file in the Bureau of Educational Service at Teachers College, University of Nebraska.

The following instructions were printed on each group of pictures:

> We herewith present the photographs of six persons all equally well trained professionally and who have been in school work sufficiently long to have proved their success or failure as administrators or classroom instructors.
>
> Will you please indicate your first, second, third, fourth, fifth, and sixth choice opposite A, B, etc.? If you care to state the element in the photograph which helped you determine your choice, please indicate it in the column marked "Reason."
>
> In case you are acquainted with any of the persons please so indicate in the column marked "Reason."

Replies were received from 61 superintendents, 38 secretaries of school boards, and 49 secretaries of placement bureaus, giving a total of 148 judges with about 3500 separate estimates.

Table 1 shows the average rankings given by each class of judges to each individual. The marked agreement of the judgments of the groups taken as a whole, that is, when their averages are compared, is very evident. On the other hand, an examination of the returns of the individual judges shows a very wide divergence.[2] There was not a single individual who was not assigned every rank from 1 to 6 by every class of judges, that is, every one was given first place by some superintendent, by some appointment secretary and so on, and sixth by some other while the others were ranged between. Yet when the averages are compared the result is as above shown. This would seem to indicate that all classes of judges were influenced in the main by the same element in the photograph.

[2] The length of the table showing these rankings precludes its display here.

TABLE 1

The ranking by the three classes of judges

RANKED BY	GROUP W						GROUP X						GROUP Y						GROUP Z					
	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Superintendents	4	1	2	3	6	5	1	6	4	2	5	3	3.5	2	6	5	3.5	1	1	5	3	2	6	4
Secretaries of School Boards	5	1	3	4	6	2	2	6	5	1	4	3	4	2	6	5	3	1	1	6	5	3	4	2
Secretaries of Bureaus	5	1	3	2	6	4	2	6	3	1	5	4	3	2	6	5	4	1	1	3	2	4	5	6

This table reads: The Superintendents gave fourth place to individual A in group W, the Secretaries of School Boards gave him fifth, etc.

TABLE 2

The composite ranking and the ranking from the records

RANKED BY	GROUP W						GROUP X						GROUP Y						GROUP Z					
	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
All Judges Averaged	5	1	4	3	6	2	2	6	4	1	5	3	4	2	6	5	3	1	1	6	2	3	5	4
Committee from Records	3.5	6	1	2	5	3.5	3	4	6	2	1	5	3	1.5	1.5	6	5	4	1	4	5	2	3	6

Average of all judges gave first place to B, second place to F, etc.

In obtaining the composite rankings of the individuals the total votes were used rather than an average of the averages of each class of judges. This composite ranking was then compared with findings of a committee of six men of the faculty of Teachers College, University of Nebraska, who had access to the records of all the individuals as kept in the office of the Bureau of Educational Service and described above. The rankings used in the second row of table 2 are the averages of the estimates of this committee of six. While they did not agree completely in the placing of the candidates there was in only 3 cases out of the 144 separate estimates a variation of as much as 2 places from the composite rankings. While it is admitted that this ranking is not beyond the possibility of error, it is in all probability the most reliable obtainable.

This table offers a comparison of the composite rankings of the judges of the photographs and those of the faculty committee. It will be noted that in only one instance is there complete agreement (individual A in group Z). Elsewhere not only is there a general divergence shown but in one case the widest possible difference appears (individual B in group W). Very frequently the divergence is 3 or 4 places. *In general then it seems that although combined judgments of this sort tend to produce agreement, this agreement may be markedly divergent from the facts.*

While the tables here given do not show it, it is an interesting fact that not one judge in the whole 148 paired the judgment of the faculty committee even in a single group. In only a very few instances did they pair as many as 2 individuals in a group. The correlation between the composite rankings of the judges of the photographs and the faculty committee was $-.10$ in group W, $+.14$ in group X, $-.01$ in group Y, and $+.37$ in group Z.

REASONS FOR JUDGMENTS

In the instructions printed on each sheet of pictures this statement was used: "If you care to state the element in the photograph which helped you determine your choice, please indicate it in the column marked 'Reasons.'"

In response to this over 80 different terms were used in describing or defining the various elements that entered into the judgments, though there was not a large number for any one teacher. A brief examination of these terms may help us to see by what process some of the judgments were arrived at. Intelligence, disposition, alertness, and force seem to be considered important points in all classes of teachers. Sympathy is often mentioned in lower grades, but rarely in the higher; while with scholarship, it is quite the reverse. Sociability is often prized in superintendents and principals, but is apparently not important elsewhere. Likewise with personality. A sense of humor is mentioned only 7 times.

While there is in some instances a considerable agreement in assigning elements to a photograph there is often a striking difference. For instance, in the case of individual A in group W, 5 said he was forceful while one said he was not, 4 said he was intelligent while 4 said he was not, 3 said he had personality while 2 said he lacked it. In the same group 2 gave B a good rating in disposition while 2 gave him poor, 3 gave C good and 2 poor, while 2 gave F good and 3 poor. Individual A in group X impressed one judge as being sincere while to another he appeared insincere. In group W, D was regarded as possessing good personal appearance by one judge but was rated oppositely by two.

Some of the reasons were very pointed while some were facetious, as in the following: "too high collar," "looks like a boob," "looks like a pupil I once had (adverse judgment)," "bookworm variety," "dead one," "head on sideways," "needs combing," "neck," "curl," "no punch," "twinkle in her eye," "pass her up," "simper," "too much grin," "good animal." However, favorable comments outnumber the unfavorable ones two to one.

In the main it would seem that the selection and assignment of character elements, in the case of photographs, is largely a subjective matter, probably being influenced by the temperament and experience of the one doing the judging. Furthermore, the dress and the pose of the subject, together with the artistry of

the picture itself are doubtless potent factors. In agreement with the findings of Landis and Phelps that people are more inclined to put a well dressed man in the category of the successful than elsewhere, so it seems that in choosing a teacher people are inclined to think well of a sensibly dressed and fairly good looking person when presented through the photograph, providing the photograph has finish.

CONCLUSIONS

The general conclusion to which this study leads is that there is little if any value in a photograph as a means of furnishing information about ability to teach, at least as now used by superintendents, secretaries of school boards, and secretaries of placement bureaus. Furthermore the following specific conclusions seem warranted by a study of the data.

1. No individual was found who possessed any particular talent for judging teaching ability from photographs.
2. No one class of judges did consistently better than any other class in ranking the teachers from their pictures.
3. The collective judgments do not seem to be any more accurate than that of the average individual chosen at random.
4. There is marked disagreement among individuals when they attempt to pick out and name the apparent elements of character in a face as shown by a photograph.
5. Apparently the chief value to be gained from the examination of a photograph by people such as are represented in this study is a rather general idea of "how one looks" and possibly to guard against being imposed upon by a person with outstanding physical defects which might make him undesirable in the schoolroom. A superintendent who is seeking a certain physical type might possibly be, in a measure, guided in his choice of teacher by a photograph.

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THE RELATIVE EFFECTS OF SIZE OF TYPE, LEADING AND CONTEXT

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For convenience of publication, an arbitrary division of this paper was made in the last issue of the JOURNAL. The preceding article outlined the scope of the investigation, reviewed the historical aspects of the problem of legibility, stated the procedure of the investigation and gave the results of Part I. Eight tables and several abstracts from these tables have been published. In this article it has been necessary to refer to both the discussion and tables in Part I where the measurement of legibility was taken as the rate of silent, mature reading. The present article gives the readers' preferences and opinions of legibility in contrast with the criterion of the reading rate and concludes the discussion of both parts of the investigation.

PART II

The foregoing information has been based upon the actual number of words read. This fact may be contrasted with the readers' preferences and opinions of legibility. See tables 1 and 2. The literal question was: Which of the above columns seemed easiest to read? If a division of the rank order of number of words read is divided into half, it is found, in Group Test A, that 75 prefer the first half of the columns in which the most read words were actually read, and 25 of the last half. In Group Test B, the ratio is 55 to 45, and in Group Test C, it is 50 to 50. These figures are merely compared for the group. The preferences of the subjects seldom agreed with their best reading rates. If the ratio of the readers' preferences is compared with actual words read, divided into the first five, mid-

dle six, and last five columns, the ratio is: Group Test A: 75, 14,11; Group Test B: 21, 35, 44; Group Test C: 25, 26, 49. This fact substantiates the reader's unreliability of judgment when compared with the reading rate.

If ten or more readers' preferences are recorded, it is found in Group Test A that 32 prefer 8 point type leaded 1 point; 30, 8 point solid; 13, 8 point leaded ½ point, and 11, 7 point leaded 1 point. In Group Test B, 32 prefer 8 point leaded ½; 30, 8 point leaded 1 point, and 10, 6¾ points solid. In Group Test C, 30 prefer 8 point leaded 1 point; 24, 8 point leaded ½ point; 11, 7 point leaded 1 point, and 10, 6¾ point leaded 1 point. The tendency of the readers is to accept the larger type faces and leading as easiest to read, though this fact does not agree with the actual number of words read. Undoubtedly in the discrimination of small differences, the readers' opinions of the easiest reading was based upon the most space which the eye had covered although larger type and leading did not permit the inclusion of as much reading material despite the fact that the eye covered more space. Undoubtedly the columns in which the most words were read on an average, show less readers' choices than they actually deserve because the readers thought they did not cover as much ground.

The reasons for the readers' preferences were varied. In general they may be classified according to factors of size, leading and interest, and miscellaneous factors which could not be divided into a more definite category.

Size was described in varying terms such as larger, largest, larger and blacker, large and uniform, larger and stronger, etc.

Leading was described by the reader as space between lines, not crowded, spaced better and not so black, greater open space, etc.

Interest was described in terms of reading material as interesting, lighter reading material, writing flowed together, interest in material read, etc.

Miscellaneous factors were suggested as follows: Felt more comfortable while reading it; Less glaring; Clear (with no other description); Could read with less trouble; Looked like other

newspaper type; Words easiest to recognize; Understood perfectly what was read; Less confusion of print; Unable to give reasons; Easiest to read; Distinct; More legible; Less strain; Seemed less effort; Words not "jumbled;" Followed out line better; Words stand out more; More read with less

TABLE 9

Reasons given for preference

READING COLUMN NUMBER	GROUP TEST A				GROUP TEST B				GROUP TEST C			
	Size	Leading	Interest	Miscellaneous	Size	Leading	Interest	Miscellaneous	Size	Leading	Interest	Miscellaneous
1	2	—	1	—	19½	6	1½	3	11	14	1	4
2	—	—	—	—	—	—	—	1	—	—	—	—
3	1	1	—	—	2½	2½	½	1½	3	3	1	4
4	—	—	½	½	—	—	—	—	—	1	—	—
5	—	—	—	—	—	—	—	—	—	—	—	—
6	—	—	—	—	1	½	½	—	2½	½	2	3
7	—	—	—	—	4	1	1	1	2	½	½	1
8	—	—	—	—	—	—	1	1	1	—	—	—
9	13½	6	5½	4	1	—	3	—	—	—	1	—
10	½	—	½	—	—	—	—	—	—	—	1	—
11	½	½	½	½	3	1	4	2	2	—	4	4
12	—	—	—	—	15	5	6	6	8	6	5	5
13	3½	3½	—	5	4	—	—	1	2	2	1	—
14	7½	13½	2	9	—	—	—	—	—	—	—	1
15	7	4	—	2	—	—	—	—	—	—	—	—
16	½	1½	1	2	—	—	—	—	—	1	2	—
Total	36	30	11	23	50	16	17½	16½	31½	28	18½	22
	100				100				100			

effort; Very plain; Minimized eye movements; Less time; Got further; Read at beginning; Easiest to eyes; It seemed best type suited to my eyes; Eyes not too tired; Less strain; Because I like that type of print, etc.

Table 9 is a complete analysis of the readers' preferences.

Whenever dual reasons were given for a preference, the reason was scored as a fraction. Compilation was made with the column number as a unit. The actual size or leading of the type may be found by referring to the column number in table 1.

The bulk of the reasons given by the readers led to direct classification. Most readers were influenced by size of type and secondly by leading. However, interest in the context which actually dominates the amount read has been relegated to a minor position in the readers' opinions. Again this shows a tendency, developed on the part of most individuals, to believe in the judgment of space as a whole, rather than in a quantitative judgment of the amount of reading within the space. The presence of a large miscellaneous class may tend to vitiate the results if this class overlaps the others. However, it cannot be more definitely distributed as it constitutes perceptual factors indefinitely analyzed by the readers.

DISCUSSION

Two deductions can be made from this experiment: (*a*) Context is a more important factor in determining legibility than the sensory content of the type setting when the reading rate is used as a criterion; (*b*) The sensory content is the basis of the readers' preferences and opinions of legibility.

In the first part of this experiment the results are opposed to what is customarily accepted in typography—namely, that legibility is increased, within limits, when the size of type and leading are increased. No deduction can be made from the value of changes in the sensory content as long as context has so great an influence. Perhaps future work in this field can establish a value proportionate to the influence of context through a weighted statistical treatment and in this manner arrive at the relative value of the sensory content. Nevertheless, these observations are presented for their present value. Any treatment of reading material attempting to determine the value of the sensory factors will be tainted by context in the same manner in which this problem has been. Many of the past experiments in legibility have been influenced by context when

meaningful reading has been employed. To attempt to avoid this influence by the use of nonsense syllables or isolated letters would nullify the object of the experiment and would test some other factor than legibility as it has been defined. Identical material can never be used because familiarity has a great influence on the rate of reading.

It is apparent from experiments in this field that many variables have entered into problems on legibility and controls have been difficult to establish. The experiment, reported in this paper, has experienced similar difficulties, but the treatment of the results has been by the method of the arithmetic means of groups of 100 subjects, which has reduced the probable error. Few former experiments have used more than eight or ten subjects and seldom over fifty subjects.

It is interesting to note the high correlation between the group tests. The correlation between the Group Tests B and C is 95 per cent direct correlation.[1] The coefficient of correlation of both of these tests with Group Test A is somewhat lower, although sufficiently high to consider the results reliable. It will be noted that the average reading rate is highest in Group Test A. An explanation for this may be found in the results of Packer and Anderson (33) in their work on the effect of summer vacation upon the rate of reading. Their observations were confined exclusively to children from the first to the fifth grades and their results show a corresponding decrease in the reading rate in tests conducted in September as against the tests conducted in May. In this experiment Group Tests B and C were made in the fall of the year and Group A in the spring. Inasmuch as a college recess period intervened between the tests, it is probable that the summer vacation period affects college students in a manner similar to that of grade school children. This observation is further substantiated by a rise in the total number of words read throughout the sixteen columns of Group Test C when compared with Group Test B. Group Test C followed Group Test B by about one month in the college year.

[1] Cf. Table 6 and discussion on page 624, this Journal, 1929, Vol. XIII, No. 6.

The difference in total reading rates is in evidence despite a slight drop in the average maturity of the readers' ages in Group Test C, and may be explained by improvements in the reading faculty of the students as they progress during the college year.

The uncontrollable variable of this experiment has been the reading material. A careful choice of this material was made originally, and previously judged as nearly equal in interest and reading difficulty as it was possible to secure. The context was simple and the style of writing was the same throughout. It is well known that simple material will be read more rapidly than difficult material, but it was thought that essentially similar material would have a constant reading rate. Judd and Buswell (27), working with university students who read long passages of different kinds of subject matter including poems, prose, text-books and foreign language reading, found that different reading attitudes were induced by different material. While it would be expected that difficult reading material would decidedly decrease the reading rate, Huey (23) had found that when individuals read silently by their own method they fell into a natural rate which was nearly uniform for page after page. Huey's statement must be qualified inasmuch as it now appears that the reading rate varies directly with context in minute changes of reading interest and difficulty and continues to vary notwithstanding the changes in the sensory content. It is apparent that if there is no uniform mechanical procedure in reading difficult material this same lack of uniformity will be relatively true in reading the most simple material despite the fact that the simplicity of the context is essentially similar.

Another factor underlying the reading attitude may be found in the interpretation of skimming by Whipple and Curtis (46). They defined different modes of rapid reading and skimming as follows: (*a*) Fast reading; (*b*) "Trailing" which is "perceiving without apperceiving," catching impressions which may or may not be meaningful for context—probably not in most cases; (*c*) "Covering," like trailing, except that it may be either up or down or right and left, while trailing is the latter; (*d*) Omitting logically; (*e*) Omitting arbitrarily. From the average time of all

observers they found that the order of speed of five methods of reading are: Skimming, maximal silent, normal silent, maximal aloud and normal aloud. Knowledge that reproduction is to be demanded slows the rate of reading of all subjects by all methods. Inasmuch as reading instructions may stimulate a different reading rate, it is probable that the interest content in a reading passage likewise may cause a difference.

A few previous experiments falling into this error may be mentioned. Gilliland (17) experimented on the effect on reading of changes in size of type, using both adults and children as subjects. Two different sets of paragraphs with relatively large changes in type size were used, but the results were influenced very probably more by context than by changes in size, particularly in the sizes under 12 point. Similarly the conclusions reached by Griffing and Franz (19) are doubtful. They had observers read two passages of the Bible containing 622 words, set in Roman type (not otherwise described) in Pica size (about 12 point) and Pearl (about 5 point). Their conclusion in favor of the larger type size possibly has been influenced by context more than by sensory content. The studies by Huey (23) have been largely confined to the reading process but his recommendations for type size may be influenced by context rather than type size and leading since he has used the reading rate as a criterion. Experimental evidence which has resulted primarily from the study of reading habits tends to confirm the importance of context as a more important factor of legibility than the type setting.[2]

The second part of this experiment has to do with an empirical judgment of the readers' opinions of legibility. The largest sensory variation, i.e., that between type set in the smallest size and largest size with leading, was 3 points, or approximately $\frac{1}{24}$ of an inch; the smallest difference is $\frac{1}{4}$ point, or about $\frac{1}{288}$ of an inch. These variations are well within the limits in which the eye can detect differences. When the subject was asked "which column seemed easiest to read," it appears that his judg-

[2] See Buswell (8), Judd (26) and O'Brien (32).

ment was based on a space relationship, carrying a picture in his mind of the space which his eye had covered as the nearest identity to the amount which was read and giving as the reason for his judgment the size of type and leading. This space concept makes many readers turn away from closely printed matter to more open printing, believing it is easier to read. This space illusion may be a corollary of the distance illusion of converging lines. Just as the architect places the columns of a cathedral nave closer together near the altar in order to give the impression of distance, the printer varies size of type and leading in order to deceive the reader in the amount of space which the eye covers.

Large type, leading, or both, at the beginning of a printed column or page trick the eye into reading. After interest in the subject matter has been established, it is reasonable to assume that the eye can accommodate itself, not to a decreased legibility because of reduction of size or leading, but to an increase of legibility as measured by the reading rate. Smaller type faces without leading probably increase the working efficiency of the eye due to the conservation of eye movements. Fatigue, particularly noticed in reading extremely small type, possibly is caused by the confined reading area. Attention is more closely fixed upon smaller sensory units which do not allow as great an interval of relaxation as do larger sensory units. But the rapid adjustment of the eye permits reading in both small and large type with seemingly equal facility. The greater amount of reading work done within the area covered by smaller type setting is seldom recognized by the reader in forming a judgment of legibility. The inherent attention value of context dominates the sensory content of reading material so that within the normal reading rate, the reader's interest in the context speeds up the reading process and the reader reads most of that which interests him most.

CONCLUSIONS

1. From the results of this experiment it may be concluded that the context of the reading material is a more important

factor in its effect on the reading rate, and consequently upon legibility, than the sensory material. Changes in size of type and leading are not as dominant an influence as changes in the context of the reading material. Because of the dominance of context, no conclusion can be drawn from the relative effects of changes in size of type and leading. Experimental evidence by those who have studied reading habits corroborates this conclusion.

2. The readers' preferences and opinions of legibility differ from the amount of reading as measured by the reading rate. The readers' preferences for larger type and leading probably are due to an impression that more material has been read because more space has been covered in the reading, although the reasons for the preferences are given in terms of sensory content. Reasons for the choice of larger sensory units in some instances are confused with context, but opinions of legibility are stated largely in terms of sensory content. The results of this experiment do not warrant specific recommendations for the use of a particular type size or leading for newspaper columns within the limits of the type size and leading that have been tested.

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FACTORS INFLUENCING SCHOOL SUCCESS IN BOOKKEEPING

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THE PROBLEM

The problem was to find what factor or factors influence success in bookkeeping, and to find what relationship might exist between certain tests and bookkeeping grades. An effort was also made to find among these tests some one or more which might be of value in the prognosis of aptitude for bookkeeping.

SUBJECTS AND METHOD OF STUDY

The study was made upon a group of seventy-five tenth grade students enrolled in the first semester of bookkeeping in the Bell High School of the Los Angeles City School System, in September 1927 and the results verified and checked upon another group of tenth grade students in the same high school in the autumn of 1928.

The chronological age range was from thirteen years and six months to eighteen years of age, but the average age was fifteen years. The IQ range was from 75 to 123 with an average IQ of 95.

With the exception of the physical examinations, which were made by the school physicians, all the tests were given and scored by the writer during the first two weeks of the school year. The testing was done in the class room in groups of approximately twenty-five, and no two tests were given on the same day.

The tests given were tests in spelling, arithmetic, the MacQuarrie Test of Mechanical Aptitude, the Thurstone Employment Test, and the Terman Group Test of Mental Ability. Correlations were made with these tests and the scores on the Carlson Bookkeeping Tests, as well as with the teachers' grades in bookkeeping.

The Carlson Bookkeeping Tests were used as a measure of the students' knowledge of the theory of bookkeeping, and the laboratory exercises completed by the students were used as a measure of ability to apply the knowledge revealed by the test. The teachers' grades were arrived at by averaging the results of the Carlson tests and the laboratory exercises.

The health phase of this study was suggested by an address of Dr. E. M. Burns, of the Los Angeles County Health Department, who stated it as his opinion that ill health was the cause of retarded mental development as well as of retardation in school.

The Health Cards, showing the result of the school physicians' physical examinations, were used in dividing the pupils into a healthy group and a group with serious physical defects in order to study the influence of health upon school success. Children who showed defective hearts and lungs combined with mal-nutrition were considered physically handicapped. Tonsil, adenoid, and orthopedic troubles when not accompanied by other difficulties were not found to be handicaps in so far as school success was concerned, hence these children were classified with the physically normal.

Those individuals classed as physically handicapped by a casual inspection and by acquaintance with them would show no sign of being different from the other students. They were regular in attendance and their physical handicap was revealed only by the physician's physical examination. The children themselves gave no attention to their trouble, took no account of it, and did not know of its existence until told.

RESULTS OF THE INVESTIGATION

In the group of children with no physical handicaps the correlation between the Terman raw score on the Terman Group

Test of Mental Ability, Form A, and bookkeeping semester grade was found to be .551 ±.08, and the correlation between the Carlson Bookkeeping Test and the Terman Intelligence Test score was found to be .648 ±.057.

It will be noted that the Terman score correlated .648 with the test score but only .551 with the bookkeeping grade, indicating that the intelligence test discovers only the ability to understand the theory but does not discover to the same extent the aptitude or willingness to do the routine work necessary for the actual bookkeeping.

TABLE 1

Correlation between first semester Bookkeeping grade and Terman Group Test of Mental Ability, Form A

TEST		r	P.E.
	Intelligence Quotient	.493	±.07
	Terman total score	.551	±.08
1	Information	.383	±.084
2	Best Answer	.271	±.092
3	Word Meaning	.317	±.089
4	Logical Selection	.218	±.096
5	Arithmetic	.553	±.089
6	Sentence Meaning	.324	±.091
7	Analogies	.564	±.068
8	Mixed Sentences	.439	±.082
9	Classification	.218	±.096
10	Number Series	.191	±.095

Terman Test 5, Arithmetic, gave a positive correlation of .553 ±.069, and test number 7, Analogies, gave a positive correlation of .564 ±.068. Other tests in the Terman Group Test gave a positive correlation of from .191 for some up to .439 for others (table 1).

The group studied included fourteen children with IQ below 90, and of this group below 90 IQ not one secured a grade above average, and only five of the fourteen managed to secure an average or satisfactory grade, and this was by students who were carrying a light program and spending many hours each

day in home study. No child with IQ below 78 secured a satisfactory or average grade, while nine of the fourteen secured an unsatisfactory or failing grade. There were fourteen children with IQ between 90 and 99, and of this group seven were below average or failing and seven were average or above average. Of the nineteen other children with IQ above 100, sixteen secured an average or above average grade and three received below average but there were no failures.

TABLE 2

Relationship between bookkeeping and tests of proficiency and aptitude for healthy children

All individuals with serious physical defects were eliminated from this group.

	CORRELATIONS WITH	
	Carlson Bookkeeping score	Bookkeeping grade
Thurstone Combined Score		.568 ± .06
Thurstone Combined Score minus Test 5	.73 ± .047	.742 ± .045
Thurstone Tests 1, 4, and 8 (checking arithmetic, code and proverbs)	.56 ± .07	.492 ± .077
Arithmetic Fundamentals (a four minute test of the writer)		.628 ± .06
Thurstone Combined Score, minus Test 5 combined with arithmetic fundamentals		.71 ± .049
Terman Total Score	.648 ± .057	.557 ± .07
Spelling	.325 ± .081	.295 ± .084
MacQuarrie Mechanical Ability Test	.176 ± .10	
Typing strokes per minute		.398 ± .106

The Thurstone Employment Test was given and the relationship with success in bookkeeping studied. It was found that the correlations with combined errors plus time score was .568 ±.06, but an analysis of the results of the test revealed that for fifteen year old children the penalty for failure to read and understand what was wanted in Test 5, Alphabetizing, was too great, and materially lowered the correlations. At the time this was discovered many students had left and could not

be retested with the omission of test 5, but the errors for test 5 were deducted and correlations made with the remaining combined error-time score. This correlation for healthy children was found to be .742 ±.045 with teachers' grades, and .730 ±.047 with the Carlson Bookkeeping Test scores.

An attempt was made to find which of the eight tests in the Thurstone Employment test would correlate highest with bookkeeping; but because the Thurstone Test is timed as a unit rather than for each separate test it was difficult to do more than find a general trend. Checking arithmetic, code, and proverbs correlated .56 ±.07 with bookkeeping test score, and .492 ±.077 with teachers' grades.

TABLE 3

Relationship between bookkeeping grade and tests of proficiency and aptitude: showing the effect of ill health upon accomplishment in bookkeeping

	CORRELATION WITH BOOKKEEPING GRADE		
	All students	Physically fit students	Physically handicapped
	r	r	
Thurstone Score minus Test 5.	.587 ±.08	.742 ±.045	−.31 ±.215
Terman score.....	.438 ±.075	.557 ±.07	−.70 ±.121

A four minute test of the writer in the fundamentals of arithmetic correlated .628 ±.06 with teachers' grades in bookkeeping. While the correlation is not so high as the modified form of the Thurstone Combined score, it is higher than the Thurstone Combined score without modification, and the very short time necessary for its administration is in its favor, and should encourage its further development.

Spelling was found to have a positive correlation of .325 ±.081 with the score on the Carlson Bookkeeping test, and .293 ±.084 with teachers' grades. This is not high enough to justify its further development as a test of aptitude for bookkeeping.

The MacQuarrie Test of Mechanical Aptitude was found to

correlate only .176 ±.10 with bookkeeping, which is too insignificant for further consideration in the prognosis of school success in bookkeeping.

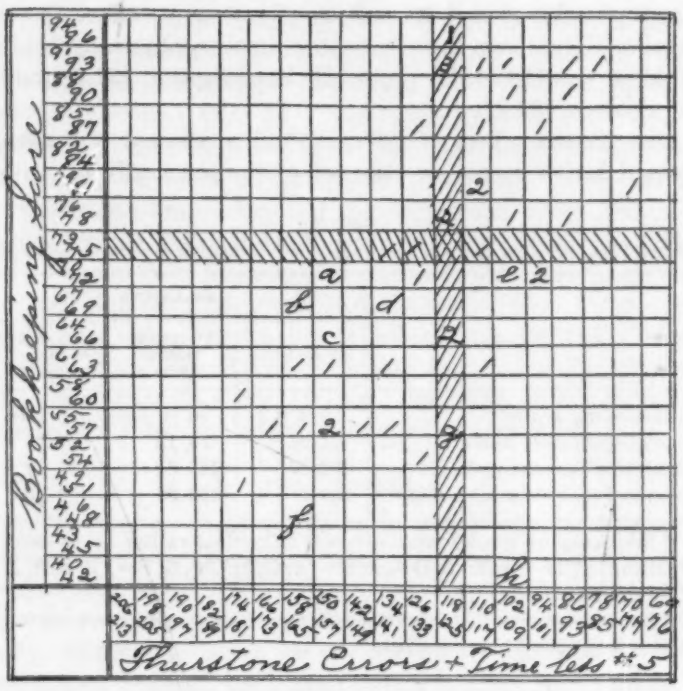

FIG. 1. SCATTER DIAGRAM SHOWING THE RELATIONSHIP BETWEEN THURSTONE COMBINED SCORE MINUS TEST 5, AND BOOKKEEPING SCORES

Individuals A, B, C, D, E, F, G, H, are those with physical handicaps, as shown by physical examinations of school physicians.

HEALTH AS A FACTOR IN BOOKKEEPING SUCCESS

The correlation with the Thurstone Test minus Test 5, was .742 ±.045 for healthy children, but for all children the correlation was only .587 ±.06 and for physically handicapped

children the correlation was $-.31 \pm .215$, and the divergence would have been greater were it not for the fact that physically handicapped children tend to get lower scores on the Thurstone Test, indicating that their physical handicap has also affected previous achievement to such an extent as to affect the test results. The mean for errors plus time on physically healthy children was 118.34; for physically handicapped, 137.2; and for all children 132.27.

The Terman Test of Mental Ability showed a tendency toward higher scores on the part of the physically fit, with a

TABLE 4

The influence of health upon the mean score in bookkeeping and other tests

	MEAN SCORE		
	All students	Physically healthy students	Physically handicapped students
Bookkeeping grade*	5.4 [C]	6 [C+]	3 [D+]
Bookkeeping test score	71.57	73.12	60.98
Thurstone Test minus Test 5†	132.27	118.34	137.32
Terman Test of Mental Ability	109.6	112.08	106.06

* Bookkeeping grades were given a numerical rating as follows: E or failing, 0; D−, 1; D, 2; D+, 3; C−, 4; C, 5; C+, 6; B−, 7; B, 8; B+, 9; A−, 10; A, 11.

† Errors plus time. A high score is a poor score, and a low score is a good score on the Thurstone Test.

mean score of 106.6 for the physically handicapped, and a mean score of 112.08 for the healthy group. Whether health has affected the intelligence, or whether the lack of intelligence has affected the health through neglect of health, or whether it is merely coincidental cannot be decided upon the data at hand.

One thing that is clearly indicated is that the bookkeeping grades are affected to a greater extent by health than the discrepancy in intelligence or the Thurstone Clerical Test score would indicate. No child whose health card indicated a serious physical defect secured a bookkeeping grade above the mean. Of all grades below average; that is below C, thirty-three and

one third per cent were secured by children with physical handicaps. In other words the eleven per cent of children with physical handicaps received thirty-three and one third per cent of the failures and below average grades.

Of the physically handicapped only one secured a good average, and two secured a low average, or C−, while all other physically handicapped children were below average, unsatisfactory or failing (fig. 1). The mean grade for physically handicapped children was a below average grade of D (table 4).

It should be borne in mind that those children classed as physically handicapped are not the puny or sick in the generally accepted sense, but are children who appear normally healthy and go about their duties and to classes in the same manner as the other children, and cannot be distinguished from the heathy children by either the teacher or fellow students; and in most cases the child himself does not realize that he is different from the other students. His physical disability was discovered only by the school physician's physical examination.

CONCLUSIONS

1. The findings of this study would indicate that a child with intelligence quotient below 80 should, under no consideration, be allowed to take up the study of bookkeeping, while the child of intelligence quotient between 80 and 90 should be allowed to take bookkeeping only if he has a capacity for hard work, is industrious, healthy, and if his position in life is such that he is to have definite need for it.

For the child with IQ above 90, who is willing to work, has physical health, an aptitude for the work, and likes the subject, there is no positive assurance that he will succeed, but it is safe to allow him to try.

2. By the use of the modified form of the Thurstone Clerical Test and tests in the fundamentals of arithmetic it is possible to predict with almost absolute accuracy the maximum possibilities of any student entering a class in bookkeeping. It will be noticed from the scatter diagram (fig. 1) that only one student who scored below the mean on the Thurstone Test received

a bookkeeping score above the mean, and in that one case the student was placed in the first interval below the mean. The child may not come up to expectations, illness, idleness, home conditions, clashing of personality with the teacher, and many other things may enter into the matter to prevent the full success to be expected, but it is possible at least to know that for certain individuals success is not possible.

3. The study revealed the fact that so long as impaired health was a factor it was not possible to predict with any degree of accuracy the work to be accomplished in bookkeeping (table 3).

The outstanding thing indicated by this study is the absolute necessity for health on the part of the bookkeeper. Heart and lungs must be healthy and keep the body supplied with a reserve of energy if the individual is to stand the constant strain of close painstaking work at a desk. Even children with superior ability and aptitude cannot succeed in bookkeeping if the health is impaired.

4. Vocational and educational guidance of the child must start with health guidance and constructive follow up work in the form of medical attention necessary to a healthy body.

Medical and dental care must be as accessible and as easily obtained by the child as is education if education is to be effective and the child is to become a useful citizen.

SEX DIFFERENCES IN MENTAL ABILITY AMONG JUNIOR HIGH SCHOOL PUPILS

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THE PROBLEM

Is there enough difference in ability to do school work between boys and girls in the junior high school to justify separating them for purposes of teaching or to justify measuring the quality of their work by different standards? Mental ability and ability for doing school work are used synonymously in this report. As Buckingham has pointed out,[1] "ability to learn" is a good working definition for intelligence insofar as academic learning is concerned. It is the purpose of this report to present findings concerning the differences in mental ability among junior high school pupils as discovered by the use of the Terman Group Test of Mental Ability.

PROCEDURE

The data include scores on the ten subtests included in the Terman Group Test of Mental Ability and the total scores for the test for 600 junior high school boys and 600 junior high school girls. The distribution of these pupils by grades was as follows:

GRADE	NUMBER OF BOYS	NUMBER OF GIRLS
7B	100	100
7A	100	100
8B	100	100
8A	100	100
9B	100	100
9A	100	100

[1] Buckingham, B. R. "Research For Teachers." New York: Silver, Burdett, and Company, 1926. Page 142.

The data were obtained from the records of the Woodrow Wilson Junior High School, the Roosevelt Junior High School, the La Jolla Junior High School, and the Francis W. Parker School, all of San Diego, California. No attempt was made to obtain an equal number of tests in each grade group from each school. Not all of the tests were given in any one school year.

Since the scores of the several parts of the test are used later in this report, it seems advisable to indicate the nature of each subtest. Each duplicate form of the Terman Group Test of Mental Ability includes ten subtests, as follows:

1. Information.
2. Best answer.
3. Word meaning (vocabulary).
4. Logical selection.
5. Arithmetic.
6. Sentence meaning (reading comprehension).
7. Analogies.
8. Mixed sentences.
9. Classification.
10. Number series.

It should be kept in mind that merely to name the tests in this way gives almost no idea of their nature and meaning. Reference must be made to the test itself for a clear understanding of the type and difficulty of the test content. It is clear, however, that the test as a whole is in part an improved school examination, and in part an improved battery of tests similar to those used before 1900 by Galton, Ebbinghaus, Cattell, and other psychologists.

This study ignores the derived scores yielded by this test, mental age and the intelligence quotient. Symonds has presented quite clearly the argument against the use of either,[2] indicating the nature and significance of their inadequacies for use in the high school. Because of the mass of data presented, it has seemed best to avoid the use of derived scores entirely in this report.

[2] Symonds, Percival M. "Measurement in Secondary Education." New York, The MacMillan Company, 1927. Pages 310–323.

The statistical work in this report has been checked twice with the aid of a Monroe Calculating Machine and tables to insure accuracy.

THE FINDINGS

Tables 1 and 2 show measures of central tendency, of reliability of these measures, and measures of dispersion.

Inspection of tables 1 and 2 shows:

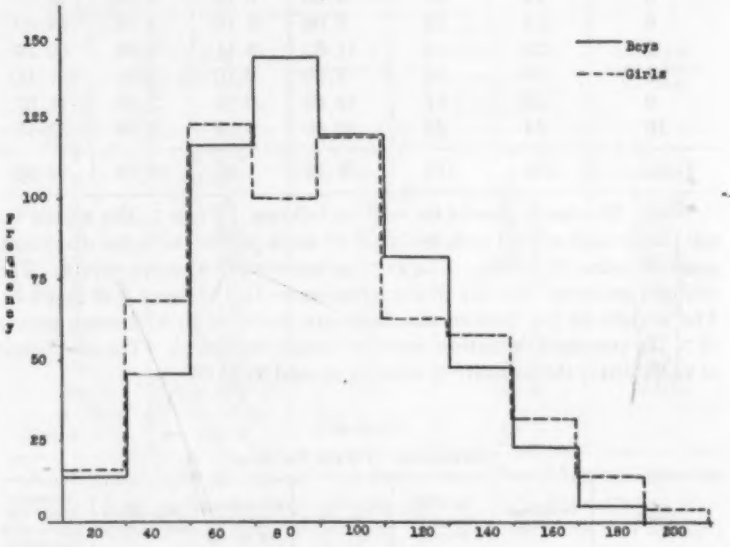

FIG. 1. DISTRIBUTIONS OF TOTAL SCORES FOR 600 BOYS AND 600 GIRLS IN THE 6 JUNIOR HIGH SCHOOL HALF GRADES

1. That in all of the subtests, with the exception of subtest 9, boys make higher average scores than do girls. The advantage is slight, however, in all cases. Boys, as might be predicted from the finding just presented, make higher total scores than do girls.

2. That in subtests 1, 3, 5, 7, 8, and 10 boys are slightly more variable in achievement than are girls, while in subtests 2, 4, 6, and 9 and in the total test girls are slightly more variable in achievement than boys.

TABLE 1

Summary of data for girls

TEST	POSSIBLE SCORE	RANGE IN SCORE POINTS	MEAN	PROBABLE ERROR OF MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION (PEARSON)
1	20	18	9.61	0.12	4.33	45.06
2	22	20	14.40	0.12	4.49	31.18
3	30	24	9.06	0.18	6.64	73.29
4	20	19	9.54	0.12	4.37	45.81
5	24	22	8.40	0.13	4.89	58.21
6	24	22	8.04	0.12	4.39	54.60
7	20	18	11.0	0.11	3.93	35 73
8	18	18	7.20	0.10	3.68	51.11
9	18	17	12.63	0.07	2.73	21.62
10	24	24	10.80	0.16	5.66	52.40
Total.....	220	174	101.13	1.07	38.74	38.30

Note: The table should be read as follows: In test 1, the scores for 600 junior high school girls included 18 score points, with the maximum possible score, 20 points. The average score was 9.61 score points. The chances are even that the true average score lies between 9.49 and 9.73. The middle 68 per cent of the cases are included in 8.66 score points (2 × the standard deviation, grouped about the mean). The coefficient of variability, the measure of relative spread, is 45.06.

TABLE 2

Summary of data for boys

TEST	POSSIBLE SCORE	RANGE IN SCORE POINTS	MEAN	PROBABLE ERROR OF MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION (PEARSON)
1	20	17	11.0	0.13	4.64	42.18
2	22	20	14.55	0.12	4.42	30.38
3	30	28	9.69	0.19	7.01	72.34
4	20	19	10.0	0.12	4.17	41.70
5	24	22	9.27	0.14	4.98	53.72
6	24	21	8.07	0.11	4.15	51.43
7	20	19	11.04	0.11	3.99	36.14
8	18	18	7.35	0.12	4.40	59.86
9	18	17	12.23	0.09	3.07	25.10
10	24	24	12.27	0.16	5.94	48.41
Total.....	220	175	104.93	1.00	36.24	34.54

3. That differences in relative spread vary considerably from subtest to subtest both for boys and for girls, but that relative spread on any one subtest or on the total test is approximately the same both for boys and for girls.

RELIABILITY OF THE DIFFERENCE BETWEEN MEAN SCORES

It has just been noted that the differences between average (mean) scores for boys and for girls are small. It is important

TABLE 3

TEST	$\frac{\text{Diff}}{\text{S.D.}_{(\text{diff})}}$	CHANCES IN 100	PER CENT OF $\text{Diff/S.D.}_{(\text{diff})}$ NECESSARY TO ALWAYS INSURE A DIFFERENCE	OBSERVED DIFFERENCE FAVORS
1	5.354	100	178.5	Boys
2	0.584	72	19.5	Boys
3	1.60	94	53.3	Boys
4	1.867	97	62.2	Boys
5	0.305	62	10.2	Boys
6	0.121	54	4.0	Boys
7	0.175	57	5.8	Boys
8	0.640	74	21.3	Boys
9	0.239	60	8.0	Girls
10	4.388	100	146.3	Boys
Total.....	1.816	96	60.5	Boys

Note: This table should be read as follows: The difference between the mean total scores for boys and for girls is 1.816 times greater than the standard error of the difference. The chances, then, are roughly 96 in 100 that the true difference (the difference between the true measures) is greater than zero. Since a $\text{Diff./S.D.}_{(\text{diff.})}$ of 3 indicates the existence of a reliable difference, the obtained result (1.816) is about 60.5 per cent of what it should be to insure a difference always greater than zero.

to know whether these differences between the means for the two sex groups for each subtest and for the total test are really significant or are accidental, i.e., not greater than might arise from the fluctuations of random sampling of identical materials.

Table 3 includes the findings as to the reliability of the differences.

The findings (table 3) for subtests 1 and 10 show that the actual differences between the mean scores for boys and for girls are over 5 and 4 times the standard errors of the differences. In these instances, we can feel certain that there is a real difference between the achievement of boys and girls in the abilities measured by these tests. These are obviously "boys'" tests. The results obtained for subtests 2, 5, 6, 7, 8, and 9 are so low that we can be reasonably certain that the differences discovered are not significant. In these instances it is not unlikely that the true difference is zero. The findings for subtests 3 and 4 and for the total scores show that the actual differences are less than twice the standard errors. These results are of doubtful significance, therefore. The evidence assembled in Table 3 supports Starch's opinion that "so far as the native abilities involved in school work are concerned, boys and girls might as well pursue the same courses from the first day of school to the last."[3]

MEASUREMENT OF RELATIONSHIP BETWEEN THE SEVERAL VARIABLES

The correlations between the subtests and between the different subtests and the total scores offer another interesting field of investigation. If the differences in mental ability between boys and girls are not reliable differences, then measures of relationship between any two variables measured by the test for boys and for girls should be somewhat similar. That is, if the correlation between any two parts is high for boys, it should be high also for girls. It should be kept in mind that "intercorrelation between the various sub-parts of a battery of tests should not be too extreme in either direction. If the correlation between any two parts is extremely high, it is probably true that they are both measuring practically the same thing, and hence one should be discarded. If they are very

[3] Starch, Daniel. "Educational Psychology. Revised Edition." New York: The MacMillan Company, 1927. Page 70.

TABLE 4

Measures of relationship (Pearson r) for paired scores on the subtests and total test, the Terman Group Test of Mental Ability, for 600 junior high school girls

The probable errors vary between .008 and .027

TEST	2	3	4	5	6	7	8	9	10	TOTAL
1	.61	.60	.55	.45	.50	.54	.53	.54	.38	.74
2		.48	.57	.43	.74	.51	.46	.56	.68	.84
3			.48	.50	.57	.46	.47	.38	.26	.80
4				.36	.59	.55	.26	.17	.58	.70
5					.32	.54	.34	.39	.66	.72
6						.47	.33	.33	.27	.68
7							.41	.39	.54	.74
8								.22	.21	.64
9									.18	.66
10										.84

TABLE 5

Measures of relationship (Pearson r) for paired scores on the subtests and total test, the Terman Group Test of Mental Ability, for 600 junior high school boys

The probable errors vary between .009 and .026

TEST	2	3	4	5	6	7	8	9	10	TOTAL
1	.60	.58	.55	.54	.42	.38	.42	.47	.40	.82
2		.23	.55	.36	.37	.52	.38	.39	.38	.64
3			.50	.57	.61	.18	.46	.53	.37	.83
4				.42	.37	.57	.53	.36	.51	.70
5					.35	.49	.42	.49	.42	.72
6						.31	.34	.29	.37	.74
7							.26	.46	.68	.70
8								.30	.20	.61
9									.39	.73
10										.80

poorly correlated, they tend to neutralize each other and lessen the general value of the test."[4]

[4] Baker, Harry J. "Manual of Directions. Detroit Advanced Intelligence Test." Bloomington, Illinois: Public School Publishing Company, 1924. Page 16.

The coefficients will be of interest to persons seeking to determine how well one variable measured by a subtest in the battery can be predicted from knowledge of another. The relationship and lack of relationship existing between the different variables measured by the parts and the whole of the Terman Group Test of Mental Ability are presented in tables 4 and 5.

The coefficients of correlation presented in tables 4 and 5 agree quite closely in the majority of cases when the measure for boys is compared with the measure for girls. This seems to indicate that the Terman Group Test of Mental Ability secures reactions from boys and girls which are comparable in that the parts of the test and the total test measure very much the same things in the same amounts both with boys and with girls. This further supports the hypothesis previously advanced that boys and girls differ very slightly, if at all, in ability to do school work (mental ability).

NOTE ON THE TESTING OF DEPARTURE FROM NORMALITY

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In the solution of many problems of mental and educational measurements, particularly those involving the scaling of test items, it is necessary to assume normality of distribution not only in the general population, but in the particular sample under consideration. In such cases it is necessary to test whether the sample in question does or does not depart significantly from the normal distribution. The usual method in such cases has been to use the chi-square test, which involves considerable labor, especially if the number of categories is large enough to reduce grouping errors to a minimum.

A simpler method has been proposed by R. A. Fisher.[1] He calculates the third and fourth moments about the mean, and from these, two measures, γ_1 and γ_2, the first of which measures asymmetry or skewness and the second kurtosis or the tendency toward peakedness or flat-toppedness. These quantities, when compared with their standard errors, show the significance of the two principal types of departure from normality.

If

$$\mu_n = \frac{\Sigma\, x^n}{N}$$

x being a deviation from the mean and N the total frequency

$$\gamma_1 = \frac{\mu_3}{\mu_2^{3/2}} = \frac{\mu_3}{\sigma^3} \; (= \sqrt{\beta_1} \text{ of Pearson's notation})$$

$$\gamma_2 = \frac{\mu_4}{\mu_2^2} - 3 \; (= \beta_2 - 3)$$

[1] *Statistical Methods for Research Workers*, Oliver and Boyd, London, 33 Paternoster Row, E.C., 1925, pp. 54–56.

DATA ANALYSIS CHART

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Study.....

Subjects.....Investigator.....Date.....

Variable.....Computer.....Date.....

SCORES		TABULATION	f	X	X^2	X^3	X^4	$(X+1)^4$
From	To							
				30	900	27,000	810,000	923,521
				29	841	24,389	707,281	810,000
				28	784	21,952	614,656	707,281
				27	729	19,683	531,441	614,656
				26	676	17,576	456,976	531,441
				25	625	15,625	390,625	456,976
				24	576	13,824	331,776	390,625
				23	529	12,167	279,841	331,776
				22	484	10,648	234,256	279,841
				21	441	9,261	194,481	234,256
				20	400	8,000	160,000	194,481
				19	361	6,859	130,321	160,000
				18	324	5,832	104,976	130,321
				17	289	4,913	83,521	104,976
				16	256	4,096	65,536	83,521
				15	225	3,375	50,625	65,536
				14	196	2,744	38,416	50,625
				13	169	2,197	28,561	38,416
				12	144	1,728	20,736	28,561
				11	121	1,331	14,641	20,736
				10	100	1,000	10,000	14,641
				9	81	729	6,561	10,000

.....	.....	.....	.....	8	64	512	4,096	6,561
.....	.....	.....	.....	7	49	343	2,401	4,096
.....	.....	.....	.....	6	36	216	1,296	2,401
.....	.....	.....	.....	5	25	125	625	1,296
.....	.....	.....	.....	4	16	64	256	625
.....	.....	.....	.....	3	9	27	81	256
.....	.....	.....	.....	2	4	8	16	81
.....	.....	.....	.....	1	1	1	1	16
.....	.....	.....	.....	0	0	0	0	1

OPERATION	VALUE	RESULT	OPERATION	VALUE	RESULT	OPERATION	VALUE	RESULT
i √	.....	Basic Data	$1/N\Sigma x$ √	.....	m	$v_4+6m^2v_2-4mv_3$	.....	
Xo √	.....		$1/N\Sigma x^2$ √	.....	v_2	$-3m^4-\frac{1}{4}\mu_2-.0125$	.....	μ_4
$\Sigma(x+1)^4$	.....		$1/N\Sigma x^3$	.....	v_3	im + Xo √	.....	M
Σx √	.....		$1/N\Sigma x^4$	.....	v_4	$\sqrt{\mu_2}$ √	.....	s
Σx^2 √	.....		m^2	.....	m^2	is √	.....	σ
Σx^3	.....		m^3	.....	m^3	μ_3/s^3	.....	γ_1
Σx^4	.....		m^4	.....	m^4	μ_4/μ_2^2-3	.....	γ_2
N √	.....		$v_2-m^2-.0833$ √	.....	μ_2	$1/\sqrt{N}$	.....	$1/\sqrt{N}$
$4\Sigma x^3$	.....	.....	$3mv_2$	.....	$3mv_2$	$1/\sqrt{N}\,\sigma$	.....	σ_M
$6\Sigma x^2$	.....	.....	$v_3+2m^3-3mv_2$	.....	μ_3	$.7071\,\sigma_M$	.....	σ_σ
$4\Sigma x$	.....	.....	$6m^2v_2$	.....	$6m^2v_2$	$2.449\,(1/\sqrt{N})$	.....	σ_{γ_1}
	.....	$\Sigma(x+1)^4$	$4mv_3$	.....	$4mv_3$	$4.899(1/\sqrt{N})$	.....	σ_{γ_2}
add	.....	check	$1/2\,\mu_2$	.....	$1/2\,\mu_2$	√ needed to find M and σ		

For the normal curve both γ_1 and γ_2 equal zero, and

$$\sigma_{\gamma_1} = \sqrt{6/N}$$

$$\sigma_{\gamma_2} = \sqrt{24/N}$$

The accompanying chart[2] shows a form for the systematic computation of these quantities, together with the mean, and standard deviation, on a calculating machine (such as the Marchant or Monroe). The variable is first tabulated, and the frequencies recorded in the f-column. Assuming an origin X_0 at the mid-point of the lowest group, we multiply the successive tabulated values of x by their corresponding frequencies without clearing; reading Σx in the lower dial and N in the upper dial at the conclusion of this operation. The machine is now cleared, and Σx^2, Σx^3, Σx^4 and $\Sigma(x + 1)^4$ are calculated in like manner, the N appearing in the upper dial at each operation affording a partial check. (By dividing the keyboard, Σx and Σx^2 may be computed at one operation.) A final check (the well-known Charlier check) is provided by $\Sigma(x + 1)^4$. The computation columns at the bottom of the chart should be self-explanatory.

This chart may be used to find the mean and standard deviation alone. In this case it is not necessary to compute Σx^3, Σx^4 or $\Sigma(x + 1)^4$. The operations needed in computing the mean and standard deviation have been marked with a check.

[2] Prepared on a duplicating machine and not available at present in printed form. The writers will be glad to mail a sample to anyone who may wish to copy it.

NEWS AND NOTES

A new publication, *The Journal of Higher Education*, has recently been inaugurated by the Ohio State University Press. It is devoted to the presentation of the educational problems of colleges and professional schools; is issued under the editorship of W. W. Charters and assistant editors, W. H. Cowley and Josephine MacLatchy. It has a board of associate editors, each representing one of the great fields of knowledge or one of the professional schools. The Journal is published ten times a year at a subscription rate of $3.00.

Announcement has been made of the Tenth Annual Ohio State Educational Conference to be held at Ohio State University April 3, 4, 5, 1930. A partial list of speakers, the sections in which they speak and the titles of their addresses (when given) follow:

Scott Berry, University of Michigan, Special Education.
Robert M. Hutchins, President, University of Chicago, General Session.
A. J. Klein, U. S. Bureau of Education, Higher Education, "Coöperative Experimentation in Higher Education."
Mark A. May, Yale University, Religious Education, "Some Scientific Aspects of Character Education;" Educational and Intelligence Tests, "Character and Personality Tests."
Elton Mayo, Harvard University, Attendance Supervisors, School Nurses, and Visiting Teachers, "Psychology in Industry;" Clinical Psychology, "The Work of Jean Piaget."
Emma Grant Meader, Russel Sage Foundation, Kindergarten, "Speech Difficulties and Personality Adjustments of School Children."
Harold O. Rugg, Columbia University, Teacher-Training.
Levering Tyson, Columbia University, Adult Education.
Ben D. Wood, Columbia University, Higher Education, "Watch the Individual Grow;" Educational and Intelligence Tests.

Preliminary announcements have been received of the First International Congress on Mental Hygiene which is to be held in Washington, D. C., May 5–10, 1930. The officers of the Congress include Herbert Hoover, Honorary President; Dr. William A. White, President; Clifford W. Beers, Secretary General; and a number of Vice-Presidents. Practically all aspects of mental hygiene will be covered by the papers offered from more than thirty countries represented. Names of speakers

will be announced well in advance of the Congress. Topics are now ready for publication and are obtainable from headquarters office, 370 Seventh Avenue, New York City. Dr. Frankwood E. Williams is chairman of the Program Committee.

"Health Education Tests," the first monograph of the School Health Research Series, has recently made its appearance under the direction of the American Child Health Association. It is prepared for the use of supervisors, directors of research, directors of health programs and others who are in charge of testing programs. The relation of tests to the aims and objectives of health instruction and the advantages of studying the results of instruction by measurements are fully described. Sample pages of tests and directions for giving are also included. Those interested may obtain further information from the American Child Health Association, 370 Seventh Avenue, New York City.

The fifty-seventh annual meeting of the National Conference of Social Work and Associate Groups will take place in Boston June 6 to 14. More than forty groups in various fields of social work will meet at that time. Begun originally in 1874 as an organization for the discussion of problems common to boards of state charities, it has grown into a general gathering of social forces, with representatives from fields concerning immigration, family case work, health, neighborhood life, dependency, delinquency, mental hygiene, and industrial and economic problems. Requests for further information may be sent to Howard R. Knight, General Secretary, National Conference of Social Work, 277 East Long Street, Columbus, Ohio.

The Sixth International Conference of Psychotechnique will be held in Barcelona, Spain, April 23 to 27, 1930, under the following officers: President, S. E. Mr. Cesar de Madariago, of Madrid; Vice-President, Mr. le Depute A. Robert, of Barcelona; Secretary General of the International Association of Psychotechnique, Dr. J. M. Lahy, of Paris; Secretary of the Conference, Dr. E. Mira, of Barcelona. Associate Secretaries Dr. J. Germain, of Madrid and Dr. C. Soler y Dopff, of Barcelona. Among the general subjects of interest to be discussed at the Conference are: a critical consideration of tests suggested by studies of industrial fatigue, minimum statistical methods necessary for the standardization of tests for psychotechnical purposes, and psychotechnical methods in the study of personality. The meetings are to be held in the Real Politecnico Hispano Americano (Urgel 187) or at the Deputation provinciale. Visitors will be given the privilege of attending the Exposition Nationale of Barcelona and Hispanoamericaine of Sevilla. Interesting auto excursions have been arranged to Montserrat and

other points of interest. The official languages of the Conference include Spanish, French, English, German, Italian and Portuguese. The steamship company, Compania Espanola de Turismo (C. E. T.) Plaza de Cataluna, 1, Barcelona, will send to all interested a detailed schedule and charges of travel.

Those desiring further information concerning the Conference should communicate with Dr. E. Mira, Secretary of the VI Conference Internationale de Psychotechnique, Urgel, 187, Instituto de Orientacion Profesional, Barcelona, Spain.

BOOK REVIEWS

SIDNEY T. SCHWAB, M.D., AND BORDEN S. VEEDER, M.D. *The Adolescent, His Conflicts and Escapes.* D. Appleton & Company, New York and London, 1929. 365 pp.

This volume is a needed addition to the literature dealing with the development and experiences of this phase of life because of the sane attitude of the authors. There has been too long the attitude that the adolescent boy and girl are "peculiar," that it is a legitimate sport to make them feel they are peculiar, and to regard this peculiarity as some sort of disease through which they must struggle unaided. These authors have here a volume that will do much to change such an attitude to one of sympathetic understanding. It is written from wide experience, gained in clinical neurology and pediatrics, in a popular style devoid of technical terms.

The latter author is responsible for the first three chapters in which he gives an account of the physical development and the time and significance of the onset of puberty as a background for the treatment of the problems of adolescence by the first author.

The greater emphasis is placed upon the mental phases of adolescence. This leads at once to a consideration of the conflicts peculiar to this stage of development, and the writer skillfully points out the causal changes and the ensuing results. Adaptation and repression are the most important psychological mechanisms furnished the developing child. With this he meets and integrates into a personality his experiences in the family, in the school, in his work, religion and with the opposite sex.

The treatment of sex problems is sane and practical and should do much to break down the existing taboos usually found with this subject.

In the part dealing with personality emphasis is laid upon the difference between behavior and conduct, a difference which exists only in the mind of the writer; and emotions are dismissed as "energizing elements." In the latter part of the book the topic of conflicts between the adolescent and the environment is treated more fully (along with the means of escaping from these conflicts, such as industry, dreams, delinquency, and suicide).

The reviewer felt that the writing is too categorical and should be spiced with illustrative cases. Outside of these insignificant defects the book deserves wide reading among both parents and teachers of

adolescents. It contains a fund of information relative to many of the problems of adolescence heretofore regarded with awe and misunderstanding.

J. R. GENTRY,
Ohio University

C. N. REXROAD. *General Psychology for College Students.* Macmillan, New York, 1929. xv + 392 pp.

R. H. WHEELER. *The Science of Psychology. Thomas Y. Crowell*, New York, 1929. xvii + 556 pp.

R. S. WOODWORTH. *Psychology.* Revised Edition. Henry Holt, New York, 1929. xiii + 590 pp.

Unlike the more mature physics and chemistry, psychology is still in its swaddling clothes with respect to agreement upon the content of the introductory course. Nevertheless, it is possible, as the recent Davis and Gould study shows, to determine characteristic trends in the amount of space devoted to topics generally considered fundamental to the science. For example, during the past 30 years approximately 13 per cent of the total number of pages in all textbooks has been concerned with general facts about sensation, consciousness, and the soul, while in the past 8 years only 6 per cent has been devoted to these topics. Other categories such as habit and learning have shown increases in relative space accorded them.

Three recent textbooks considerably increase the proportion of the volume concerned with learning and habit, individual differences and personality. Rexroad further devotes more than the expected proportion to method, nervous system, and language. There is still a meager portion of these texts given to mental hygiene, moral and social behavior; but it is safe to predict that the next texts will contain developments of these topics. Wheeler even now devotes approximately twice as much relative space to social behavior as is commonly found in other recent texts. Both Woodworth and Wheeler give a little more importance to mental hygiene than is common.

Those acquainted with the first edition of Woodworth will find the familiar twelfth chapter (Intelligence) amplified and moved forward to the position formerly held by "Reactions." At the same time, the treatment of the nervous system has been reserved for the second last chapter, "in the hope that it will mean more to the student after he has acquired a stock of psychological knowledge to be tied up with the physiology." Two old chapters, Attention (Chap. XI), and Perception (XVII), are combined into one under the caption "Observation" (Chap. IX). Again, Feeling (Chap. IX) and Emotion (Chap. VII) are combined into one chapter (Chap. VII), and Instinct is given a scant three pages under Heredity and Environment (Chap. V). All of this re-

arrangement and in particular his treatment of Feeling reflects the author's growth from the older structuralism to the newer naturalistic viewpoint. Likewise, learning has been attributed a more definite treatment with extensive explanatory material, largely in terms of the conditioned response. Highly significant as characterizing the whole treatment is the elimination of the old subtitle to the text "A Study of Mental Life." Although the revision is complete enough to antiquate the older edition, throughout the text there is a paucity of descriptive experimental material, and an excess of analytical explanatory detail which, in the opinion of the reviewers, is undesirable for the introduction to any science. From the standpoint of the beginning student a wider appreciation of method, and a clearer understanding of the science can be gained from descriptive rather than explanatory subject matter.

In keeping with the organismic viewpoint, Wheeler treats the social aspects of psychology first. Sensations, considered as derived from the whole as products of structural analysis, are placed where they logically belong according to his system near the end of the book. The following two chapters deal with the structure and function of the nervous system. Here he reviews in considerable detail the work of Sherrington, Lashley, Cameron, Edinger, and others. Coghill's recent work on Amblystoma is cited to support his contention that the reflex mechanism is inadequate to explain behavior. While every one will not agree with his selection throughout the text of illustrative literature in some cases, he has nevertheless included more new experimental material than any recent text.

The two chapters on Emotion are particularly confusing. Under "methods of impression" there is an extensive treatment of psychoanalysis—including a discussion of the views of Freud, Jung, and Adler. The expression, "methods of impression," seems to be inapplicable. The three chapters on Learning, comprising about 16 per cent of the book, in addition to including abundant material from recent literature, emphasize the application of *Gestalt* principles to the problem.

On the whole, the high level in subject matter and style makes the book more a treatise on systematic psychology than a beginner's textbook. It is the author's expressed intention that it should be more inclusive, more up-to-date and less elementary than the textbooks now available. He believes that they "have not kept pace with psychological research" and that "the science is being devitalized by adherence to old problems and theories."

Aside from pedagogical and methodological considerations, Wheeler's thesis is fresh, interesting, and for the first time presented readably. The human, or any other organism, is understandable only in relation to the society in which he finds himself. His adjustments to society can never be explained by destructive structural analysis, but only lend

themselves to a study of the varying conditions under which they occur in order to ascertain what conditions are essential to their existence. No assumption is made with respect to the ultimate nature of the human organism. We study him as we find him, a unified, intact, reacting organism, "a being which cannot be explained in terms of dissected parts." As in other energy systems, human behavior continues until an equilibrium of tensions is established. Since action comes about as a result of disturbed tensions, the actions within a system may be said to take place with respect to this limit. It, therefore, becomes an end or goal, and no living organism reacts until a remote end is established. Thus, there is no ineffective or wasted motion, no trial, no error, but only a "question of the degree of configurational organization." Activity at a given moment is due to a set of organismic conditions, a set of inherited and a set of learned. Rather than considering the learned as a result of the others, it is considered a group of factors over which one has control while the hereditary are out of control and the organismic are partly so. Social conditions are among the most potent conditions of reaction. So far the reviewers are perfectly willing to go with the author; but in numerous places throughout the text Wheeler stresses the fact that the difference between simpler and more complex energy systems lies not alone in their relative complexity and variability, but that also the latter *consciously* apprehend the goal. There we cannot go. Although this is not a question of psychology, and the interpretation of subject matter seems to be uncolored by this position; nevertheless, the text would be hard to teach by one who did not fundamentally agree with the author in this point.

The author makes much of "The Principle of Least Action," a principle perhaps best illustrated when a rat, given a choice of paths in a maze, chooses eventually the shortest one. Whether or not Wheeler considers the principle as explanatory or not is doubtful—some statements seem to indicate that he does. If the principle is to be made at all a valuable teaching aid, its application will have to be considerably clarified. It has possibilities, but in its present form leaves the reviewer quite cold.

As far as viewpoint and arrangement are concerned, Rexroad is the exact antithesis of Wheeler. He begins with an introduction to science leading, near the end of the chapter, to a mechanistic conception of the universe and energy. The second chapter corresponds to the usual introduction to psychology. Then follow three chapters, nearly a sixth of the entire book, dealing with the synthesis of an organism in the mechanistic universe as described in the first chapter. Although this is a relatively small portion of the text; nevertheless, if we went into it in the detail required to make it effective to a student not thoroughly grounded in physics and chemistry, one-half a semester would slip away with hardly a mention of psychology. Child's and Herrick's contribu-

tions on the gradient theory are examined in detail and an application made to behavior.

The remainder of the book is more specifically devoted to orthodox psychology—developed genetically and behavioristically. In contrast with Wheeler he treats the conscious apprehension of a remote goal as a result of self stimulation through language. Insight, Wheeler's criterion of conscious behavior, is described as a verbal formula in human examples; but is not clearly defined in non-verbal animals.

Man's sensory discrimination is described as "non-instrumental analysis" as compared to the "instrumental analysis" of the physicist and chemist. Thus the student is introduced to a new version of the old mind-body problem.

The book ends with a brief chapter on Ideals and Purposes treated as verbal or manual responses. Throughout the text, experimental literature is conspicuously absent in contrast with Wheeler.

F. C. Dockeray and Willard L. Valentine,
Ohio State University.

The Foundations of Experimental Psychology. The International University Series in Psychology. Edited by Carl Murchison. Published by Clark University Press, Worcester, Mass., 1929, 907 Pages.

This is the first volume of a projected series of handbooks for experimental psychology. It clearly shows the changes that have taken place since Titchener's qualitative and quantitative manuals. In this review little more can be done than to enumerate the topics. Twenty-three contributors participated and among these are to be found the investigators who are recognized leaders in their respective fields. Not all the articles are of equal merit. One could hardly expect this where the number of collaborators is so large and where the editorial task of unifying the contributions presents so many difficulties. However, some of the illustrations are so poor as compared with the generally high character of the typography that they should have been redrawn.

T. H. Morgan begins the work with the mechanisms and laws of heredity and W. J. Crozier follows this with the study of living organisms and experimental methods applied to orientation in animal behavior. His experiments illustrate how the methods of physics and mathematics may be used in formulating such fundamental conceptions as difference, variation, and variability in the measurement of human and animal behavior. Alexander Forbes describes the mechanism of reaction and has prepared an excellent summary of the experimental results of sensorimotor function.

L. T. Troland treats visual phenomena and their stimuli; and Selig Hecht supplements vision with a chapter on the photoreceptor process. H. Banister and H. Hartridge present material on audition. The chemical senses are assigned to George H. Parker and W. J. Crozier. The sense

of feeling as presented by J. P. Nafe is going to be criticized from many angles. Space and non-auditory labyrinth are treated by J. Q. Holsopple; hunger and thirst by W. B. Cannon. The controversial topic of emotion appears in two sections: I. The neuro-humoral basis of emotional reactions by Philip Bard; II. The expressions of emotion by Carney Landis. Both of these contributions illustrate to what extent psychology has changed within the last twenty years.

The problem of learning and variation of response, which at the present time is perhaps the outstanding problem in psychology, is given to K. S. Lashley for the nervous mechanisms of learning, and to W. S. Hunter for the experimental studies. For the reviewer these chapters clear up the source of much of the confusion in modern psychology. According to Hunter "learning is taking place whenever behavior shows a *progressive change*, or *trend*, with a repetition of the same stimulating situation and where the change cannot be accounted for on the basis of fatigue or of receptor or effector changes" (p. 564). Lashley gives an excellent review of the sensorimotor mechanisms of learning and concludes that the essential condition is that physiological mechanism which is operative in our "responses to ratios of intensity." He believes that theorizing on the nature of this function is fruitless until further experimental data have accumulated.

Arnold Gesell describes the individual in infancy and calls attention to the special need for investigating the effect of maturation on the development of infant behavior. The general ability of the individual in school is presented by Rudolf Pintner, and the special abilities and their measurement by F. N. Freeman. Both these chapters give a clear-cut exposition of the nature and uses of mental tests. Continuing into adult behavior M. A. May presents the adult in the community; the conflict and survival of cultures is presented by Clark Wissler; and the abnormal individual is treated by S. I. Franz. The last two chapters are devoted to measurement; first, the general principles, and then the statistical treatment of typical problems, both written by T. L. Kelley and Eugene Shen.

The editor of this series is to be congratulated. There is a clear indication that in time psychology will have its formulae, tables of constants, fundamental laws, which will form an extensive appendix. Perhaps it is too soon to expect this even for experimental psychology, However, those who have been predicting that psychology will become less "unique" as it sets itself the task of investigating human behavior, may well point to this volume in confirmation of their prophetic "insight." The references to the literature are not equally complete, but they open the way. The names index and the topical index are designed to cover the range of the treatise.

ALBERT P. WEISS,
Ohio State University.

NEW BOOKS AND PAMPHLETS RECEIVED*

Books and pamphlets for review should be sent to James P. Porter, Ohio University, Athens, Ohio.

Adaptability to New Situations. SAM R. LAYCOCK. Warwick and York, Baltimore, Md. 1929. $2.40. 170 pp.

Experiments in General Psychology. NORMA V. SCHEIDEMANN. University of Chicago Press, Chicago, Ill. $1.00. 108 pp.

Generalizations Basic to the Social Studies Curriculum. NEAL BILLINGS. Warwick and York, Baltimore, Md., 1929. $3.00. 289 pp.

Information for Prospective College Students. C. E. PARTCH. Rutgers College Bulletin, Series VI, No. 3, New Brunswick, N. J. 64 pp.

Literature of American School and College Athletics. W. CARSON RYAN, JR. Carnegie Foundation for Advancement of Teaching, Bulletin No. 24. 522 Fifth Avenue, New York City. 305 pp.

Mental Hygiene and Social Work. PORTER R. LEE AND MARION E. KENWORTHY. Commonwealth Fund, Division of Publications, 578 Madison Avenue, New York City, 1929. $1.50. 309 pp.

Motion Pictures in History Teaching. DANIEL C. KNOWLTON AND J. WARREN TILTON. Yale University Press, New Haven, Conn. $2.00. 183 pp.

Personality Adjustments of School Children. CAROLINE B. ZACHRY. Charles Scribner's Sons, New York City. 306 pp.

Le Probleme de la Prophylaxie Mentale. DR. TOULOUSE. Hospital Henri Rousselle, Paris, France. 24 pp.

Problems of Science Teaching at the College Level. ARCHER WILLIS HURD. University of Minnesota Press, Minneapolis, Minn. $2.00. 191 pp.

Publications by The Crime Commission of New York State. J. P. Lynn Company, Printers, Albany, N. Y.:

From Truancy to Crime—A Study of 251 Adolescents.
Individual Studies of 145 Offenders.
Problem Boys and Their Brothers.
A Study of Environmental Factors in Juvenile Delinquency.
A Study of 201 Truants in the New York City Schools.
A Study of Delinquency in a District of Kings County.
A Study of Delinquency in Two Rural Counties.

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* Mention here does not preclude further comment.

Report of Conference on Midwestern Archaeology, St. Louis, Mo., May 18, 1929. National Research Council of the National Academy of Sciences, Washington, D. C. 120 pp.

Self-Aids in the Essentials of Grammatical Usage. L. J. O'ROURKE. Educational and Personnel Publishing Company, 3506 Patterson St., N. W., Washington, D. C. 202 pp.

Stammering and Its Permanent Cure. ALFRED APPELT. E. P. Dutton and Company, New York City. $2.25. 227 pp.

Directory of American Psychological Periodicals (*Continued*)

Journal of Personnel Research—Baltimore: Williams & Wilkins Co. Subscription $5.00. 500 pages approximately. Edited by Walter V. Bingham, and Clarence S. Yoakem. Bi-Monthly.

Genetic Psychology Monographs—Worcester, Mass.: Clark University Press. Subscription $7.00 per volume. Two volumes per year, 600 pages each. Edited by Carl Murchison and an international co-operating board. Monthly. Each number one complete research. Child behavior, differential and genetic psychology. Founded 1925.

Psychological Abstracts—Princeton, N. J. Subscription $6.00. 600 pages ann. Edited by W. S. Hunter. Monthly. Abstracts of psychological literature. Founded 1927.

Mental Measurement Monographs—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1925. Edited by Knight Dunlap and Buford Johnson. Published without fixed dates, each number a single research.

Studies in Psychology and Psychiatry—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1926. Edited by Edward A. Pace. Published without fixed dates, each number a single research.

Journal of General Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 600–700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Experimental, theoretical, clinical, and historical psychology. Founded 1927.

Journal of Social Psychology—Worcester, Mass.: Clark University Press. Subscription $7.00. 500–600 pages annually. Edited by John Dewey, Carl Murchison and an international cooperating board. Founded 1929. Quarterly. Political, racial, and differential psychology.

Directory of American Psychological Periodicals

American Journal of Psychology—Ithaca, N. Y.; Morrill Hall.
Subscription $6.50. 600 pages annually. Edited by M. F. Washburn, K. M. Dallenbach, M. Bentley, E. G. Boring. Quarterly. General and experimental psychology. Founded 1887.

The Pedagogical Seminary and Journal of Genetic Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Child behavior, differential and genetic psychology. Founded 1891.

Psychological Review—Princeton, N. J.: Psychological Review Company. Subscription $5.50. 480 pages annually. Bi-monthly. General. Founded 1894. Edited by Howard C. Warren.

Psychological Bulletin—Princeton, N. J.: Psychological Review Company. Subscription $6.00. 720 pages annually. Psychological literature. Monthly. Founded 1904. Edited by Samuel W. Fernberger.

Psychological Monographs—Princeton, N. J.: Psychological Review Company. Subscription $6.00 per vol. 500 pp. Founded 1895. Ed. by Raymond Dodge. Published without fixed dates, each issue one or more researches.

Psychological Index—Princeton, N. J.: Psychological Review Company. Subscription $4.00. 300–400 pp. Founded 1895. Edited by W. S. Hunter. An annual bibliography of psychological literature.

Journal of Philosophy—New York, 515 W. 116th St.
Subscription $4. 728 pages per volume. Founded 1904.
Bi-weekly. Edited by F. J. E. Woodbridge and Wendell T. Bush.

Archives of Psychology—Sub-Station 84, N. Y.: Archives of Psychology.
Subscription $6. 500 pp. ann. Founded 1906. Ed. by R. S. Woodworth.
Published without fixed dates, each number a single experimental study.

Journal of Abnormal and Social Psychology—Eno Hall, Princeton, N. J.
Subscription $5. Foreign, $5.25. Acting Editor, Henry T. Moore.
Quarterly. 432 pages annually. Founded 1906. Abnormal and Social.

Psychological Clinic—Philadelphia: Psychological Clinic Press.
Subscription $2.50. 288 pages. Ed. by Lightner Witmer. Founded 1907.
Without fixed dates (9 Numbers). Orthogenics, psychology, hygiene.

Training School Bulletin—Vineland, N. J.: The Training School.
Subscription $1. 160 pp. ann. Ed. by E. R. Johnstone. Founded 1904.
Monthly (10 numbers). Psychology and training of defectives.

Comparative Psychology Monographs—Baltimore: Johns Hopkins University Press. Subscription $5. 500 pages per volume. Edited by W. S. Hunter.
Published without fixed dates, each number a single research.

Psychoanalytic Review—Washington, D. C.: 3617 10th St., N. W.
Subscription $6. 500 pages annually. Psychoanalysis.
Quarterly. Founded 1913. Ed. by W. A. White and S. E. Jelliffe.

Journal of Experimental Psychology—Princeton, N. J. Psychological Review Company. 500 pages annually. Experimental.
Subscription $6.00. Founded 1916. Bi-monthly. Ed. by Madison Bentley.

Journal of Applied Psychology—Baltimore: The Williams & Wilkins Co.
Subscription $5.00. 400 pages annually. Founded 1917. Bi-monthly.
Edited by James P. Porter, Ohio University, Athens, Ohio.

Journal of Comparative Psychology—Baltimore: Williams & Wilkins Co.
Subscription $5. 500 pages annually. Founded 1921.
Bi-monthly. Edited by Knight Dunlap and Robert M. Yerkes.

(Continued on Third Cover)